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Phase II RCRA Facility Investigation Report

Tooele Army Depot-North Area
Group A Suspected Releases SWMUs

Volume II
Appendices A-K

August 1997

DTIC QUALITY INSPECTED 3

MONTGOMERY WATSON

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AEC Form 45, 1 Feb 93 replaces THAMA Form 45 which is obsolete.

APPENDIX A

PHASE II RCRA FACILITIES INVESTIGATION FIELD PROGRAM

A.1 INTRODUCTION

A.1.0.1. This appendix summarizes field activities conducted by Montgomery Watson in support of the Phase II RFI at TEAD-N during the fall of 1993 and spring of 1994, and includes descriptions of the investigation scope, organization of project personnel, and a summary of the field work performed at each SWMU. In addition, facility-wide investigation activities are discussed. Also included in this appendix are descriptions of the health and safety program under which all field activities were conducted, and descriptions of sample collection, handling, and shipping procedures.

A.1.0.2. The Phase II RFI field activities were conducted without significant deviation from the project work plans prepared for this investigation. Although methodologies were revised in the field when necessary, data quality objectives were met without exception. For example, 1 of the 20 soil borings at SWMU 20 was dug with a stainless steel shovel rather than drilled with a hollow-stem auger rig, because overhead power lines prevented access by the drill rig. Although the excavation methodology was revised, the planned location was maintained and the data quality objective met. These include the Data Collection Quality Assurance Plan (MW, 1993a), the Data Management Plan (MW, 1993b), the Health and Safety Plan (MW, 1993c). And the Project Management Plan (MW, 1993d). Each of these plans was reviewed and approved by the UDEQ and the USEPA.

A.2 SCOPE OF THE PHASE II RFI FIELD PROGRAM

A.2.0.1. Phase II RFI field work was conducted at each of the eight Group A suspected releases SWMUs in the North Area of TEAD. The Phase I RFI program had investigated suspected releases of contaminants from 20 SWMUs at TEAD-N, and qualitatively prioritized them for further work, based on degree and type of contamination. Seven of the SWMUs investigated during the Phase II RFI were those assigned the highest priorities based on the Phase I RFI results, which found that contaminants had been released to the environment from each of these facilities. An additional SWMU was added to this group midway through the investigation, when regulatory review defined a SWMU that had not previously been investigated.

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While the objective of the Phase I RFI was to determine the presence or absence of contamination, the Phase II RFI objective was to support risk-based decisions regarding remedial actions by defining the horizontal and vertical extent of contaminants. At each of the Phase II SWMUs a site-specific sampling program was developed using a variety of investigative techniques, depending upon the site conditions and types of contaminants present. The majority of the field work was conducted during October and November, 1993, with some additional field work during May 1994 and August 1995. All sample locations and a summary of analytical results are included in the figures and tables in each SWMU-specific section of Volume I of this report.

A.2.0.2. Activities conducted during the Phase II RFI at TEAD-N consisted of the following:

- Obtaining base access for all project personnel and field vehicles.
- Establishing on-base support facilities, including an office trailer, restroom facilities, and on-site communications.
- Obtaining necessary excavation permits, utility clearances and discharge permits to conduct field activities.
- Establishing a non-treated clean water source to be used for all field operations, including decontamination procedures.
- Drilling and sampling 21 3-foot soil borings and collecting eight surface soil samples at SWMU 20.
- Obtaining one surface water and two sediment samples from a watering trough and wet area at SWMU 21.
- Drilling and sampling 11 3-foot and three 20-foot soil borings at SWMU 34.
- Hand augering and sampling eight 3-foot soil borings and collecting eight surface soil samples at SWMU 37.

- Drilling and sampling three 3-foot, 20 5-foot, 12 10-foot, and four 100-foot soil borings and collecting seven surface soil samples at SWMU 42.

- Conducting an XRF field survey for lead at SWMU 42.

- Conducting a geophysical survey at SWMU 42.

- Collecting eight air filter samples over two rounds of air monitoring at four separate locations in and around SWMU 42.

- Excavating seven test pits at SWMU 42, and sampling two of them.

- Drilling, constructing, and developing two deep (approximately 350 feet) monitoring wells at SWMU 45.

- Conducting two rounds of groundwater sampling at the two new wells and one existing well at SWMU 45.

- Conducting aquifer tests and measuring groundwater elevations at the two new wells at SWMU 45.

- Drilling and sampling two 10-foot borings at SWMU 48.

- Collecting 22 surface soil samples for total chromium and hexavalent chromium analyses from SWMUs 1, 20, 21, and 42.

- Surveying the State Plant coordinates and elevations of the four 100-foot borings at SWMU 42, and two new monitoring wells at SWMU 45, and the four air monitoring stations at SWMU 42.

- Conducting a video survey of the stormwater lines in the 500-Series Area.

- Drilling and sampling 17 10-foot borings along the stormwater line in the 500-Series Area.

- Plotting all sampling locations in relation to field survey references established during the Phase I RFI.

- Conducting an ecological survey of each of the eight investigated SWMUs.

- Conducting all applicable on-site health and safety monitoring of project personnel.

- Shipping the samples to the Environmental Science and Engineering (ESE) analytical laboratory in Gainesville, Florida, for analysis, except the soil samples collected in August 1995 which were delivered to the DataChem analytical laboratory in Salt Lake City, Utah.

- Maintaining all required documentation

A.3 FIELD PROGRAM ORGANIZATION

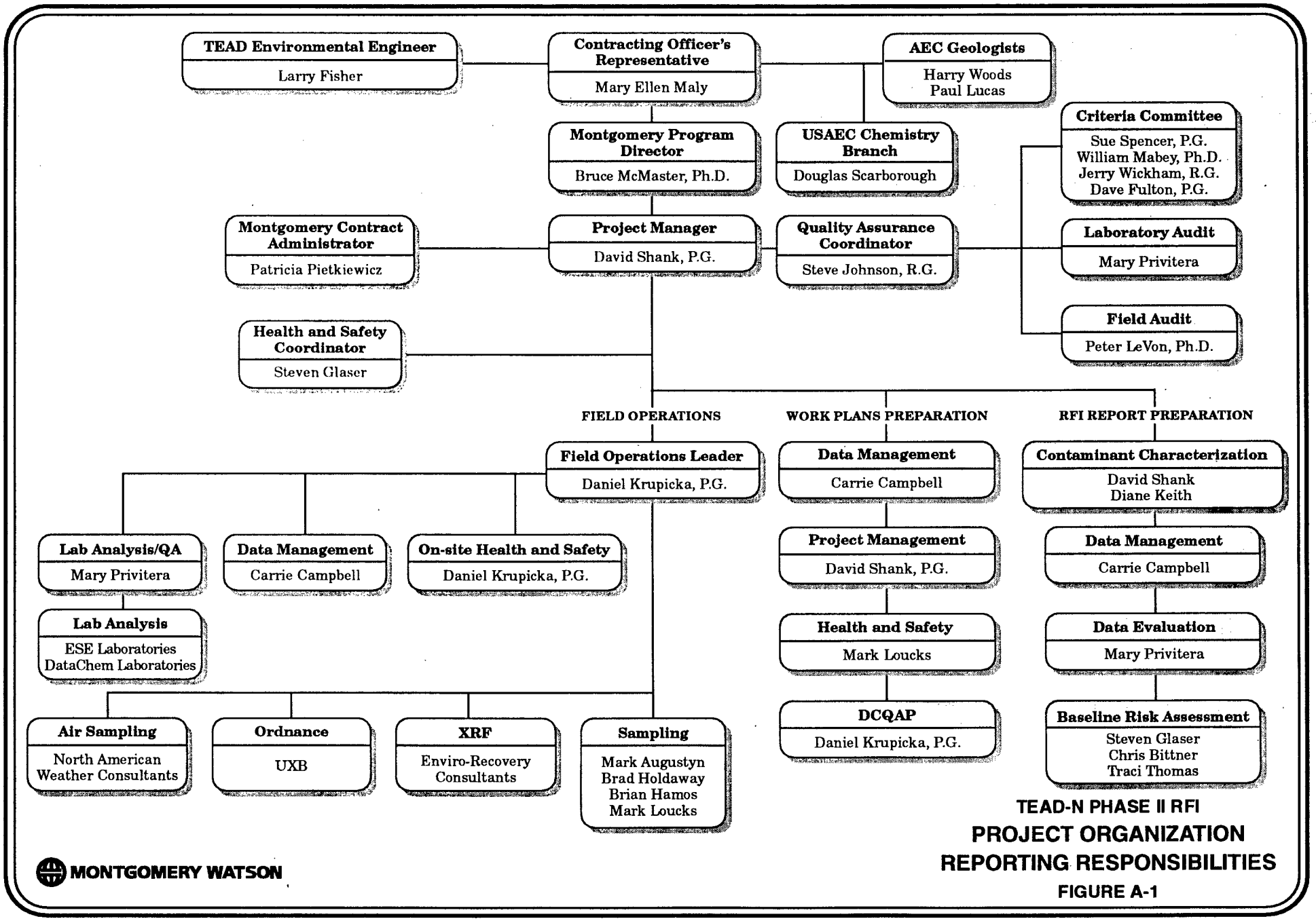
A.3.0.1. The Montgomery Watson project team for the 1993 RFI was staffed and supported mainly through the Salt Lake City office of Montgomery Watson. Support staff from other Montgomery Watson offices were utilized as needed. The Montgomery Watson team was also supported by personnel from several qualified subcontractors at various stages of the project. Figure A-1 shows the project organization for this Phase II RFI.

A.3.1. Montgomery Watson Field Team Organization

A.3.1.1. Montgomery Watson field team personnel were divided into two separate field teams, which were supervised and coordinated by the Field Operations Leader. These field teams were designated "Team A" and "Team B" for purposes of field operations identification. Team A consisted of two Montgomery Watson employees who were responsible for all sampling activities except those associated with the four 100-foot borings at SWMU 42. Team B consisted of one Montgomery Watson employee and the drilling subcontractors personnel. This team was devoted to drilling and sampling the four 100-foot soil borings at SWMU 42 and to drilling and installing the two deep monitoring wells at SWMU 45.

A.3.1.2. In addition to providing supervision of the field teams, the Field Operations Leader provided field supervision for all subcontractors associated with the field program, and served as the On-site Safety Officer.

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MONTGOMERY WATSON

TEAD-N PHASE II RFI

PROJECT ORGANIZATION REPORTING RESPONSIBILITIES

FIGURE A-1

A.3.2. Field Program Subcontractors

A.3.2.1. The following subcontractors were utilized during all or part of the Phase II field investigation at TEAD-N:

- UXB International, Inc. (UXB), of Chantilly, Virginia, fielded personnel for explosive ordnance support at selected SWMUs. Their responsibilities for this project were unexploded ordinance (UXO) detection and escort for Montgomery Watson personnel, and for other subcontractors working at the OB/OD area of TEAD-N while conducting the ecological survey, as well as at SWMU 42 while performing various field activities.

- ESE Laboratory of Gainesville, Florida, provided the analytical laboratory work for the Phase II RFI. ESE is certified by both USAEC and the DEQ, and was responsible for the analytical tasks associated with the investigation, as well as electronic transfer of analytical data to Montgomery Watson and to the IRDMIS. SWMU-specific tables of analytical results are included in the RFI Report with the discussions of contamination characterization for each SWMU. Appendix E contains an evaluation of the analytical program. Chemical data files containing all analytical results are included as Appendix P.

- Caldwell, Richards and Sorensen Engineering, Inc. (CRS) of Salt Lake City, Utah, performed location and elevation surveys for the two new monitoring wells at SWMU 45, the four 100-foot borings at SWMU 42, and the four air monitoring stations. A summary of the field survey data is included in Appendix I.

- Layne Environmental Services, Inc. (Layne) of Salt Lake City, Utah, drilled and constructed the two deep monitoring wells at SWMU 45 and drilled and abandoned the four 100-foot borings at SWMU 42. Layne provided drilling equipment, operator personnel, steam cleaning and soil sampling equipment (i.e., cyclone hopper, split-spoon soil samplers, etc.), and a decontamination area for steam cleaning equipment. Layne also provided a smeel rig for developing the two new monitoring wells.

- Overland Drilling of Salt Lake City, Utah, was responsible for drilling shallow boreholes at SWMUs 20, 34, 37, and 42. Overland provided an all-terrain, hollow-stem auger drill rig, operator personnel, and all equipment and facilities for steam decontaminating equipment.

- EarthTech Drilling Company of Sandy, Utah, was responsible for drilling shallow boreholes at SWMU 48 and along the stormwater line in the 500-Series Area. EarthTech provided an all-terrain, hollow-stem auger drill rig, operator personnel, and all equipment and facilities for steam decontaminating equipment.

- The Salt Lake City office of Dames and Moore provided geotechnical support for this investigation by conducting geotechnical soil analyses of selected soil samples from the borings. Dames and Moore provided the personnel and facilities to conduct soil sieve and Atterberg limit analysis, as well as specific gravity determinations. Appendix J contains the results of the Dames & Moore geotechnical testing program.

- Enviro-Recovery Consultants (ERC), of Salt Lake City, Utah conducted field screening for lead contamination at the Bomb Washout Building (SWMU 42) using XRF methods. ERC prided a portable XRF spectrometer and operator personnel for conducting real-time metals analysis. These data assisted in defining the horizontal and vertical extent of lead contamination. ERC supplied the data in an appropriate format to the Montgomery Data Management Coordinator. Appendix G summarizes the XRF field screening results.

- North American Weather Consultants, of Salt Lake City, Utah provided support for the air monitoring activities conducted at SWMU 42. These services included assisting in site selection for the air samplers; meteorological monitoring; and installation, calibration, operation, and collection of samples from five "hi-vol" air samplers placed in four separate locations. North American Weather Consultants submitted the filter samples and appropriate QC blanks to the analytical laboratory.

- Dan's Field Service of Salt Lake City, Utah, provided a smeel rig for the two rounds of groundwater sampling conducted on the three monitoring wells in

SWMU 45. Dan's also provided a stainless steel submersible pump, poly tank for purge water, operator personnel, and a steam cleaner for equipment decontamination.

- Roto-Rooter of Salt Lake City, Utah, provided the video camera equipment, operator personnel, and support truck for the video survey conducted inside the stormwater pipeline that leads from the Pesticide Handling and Storage Area (SWMU 34) to the Stormwater Discharge Area (SWMU 45).

- Practical Geophysics of Salt Lake City, Utah, conducted terrain conductivity and magnetic geophysical surveys at the Bomb Washout Building (SWMU 42). Practical Geophysics also prepared a summary report of their activities which is included as Appendix F.

A.4 SWMU-SPECIFIC INVESTIGATIONS

A.4.0.1. Introduction. This section summarizes Phase II RFI field activities at individual SWMUs at TEAD-N. A tabular summary of the SWMU-specific sampling programs is included as Table A-1.

A.4.1. Preparatory Activities

A.4.1.1. During the period of August 4 to October 4, 1993, Montgomery Watson personnel completed several activities in preparation for the upcoming field effort at TEAD-N:

- Montgomery Watson project personnel visited TEAD-N to meet with AEC, State of Utah, and U.S. EPA personnel for the purpose of familiarization with SWMU locations and to discuss monitoring well placement, sampling locations, and sampling rationale.

- Water Well No. 3 was sampled and tested according to AEC procedures and designated a clean water source.

- The mobile office trailer was delivered to the Depot and placed at the north end of the Maintenance Area for use by Montgomery Watson personnel during the field effort.

TABLE A-1

PHASE II RFI FIELD SAMPLING PROGRAM SUMMARY – GROUP A SUSPECTED RELEASES SWMUs

SWMU Number	Site Name	Sampling Objective	Program Scope	Rationale
1	Main Demolition Area (includes SWMU 1a)	No additional sampling to define contaminant extent. Investigate amount of chromium present as hexavalent chromium in surface soils at SWMU 1.	• Collect four surface soil samples and submit for total chromium and hexavalent chromium analysis.	Because, as a RCRA interim permitted facility, additional sampling and characterization will be conducted upon closure, no sampling to further define contaminant extent was conducted. Define hexavalent chromium concentrations for risk assessment.
1b	Burn Pad	No additional sampling necessary; existing data base sufficient for risk assessment.	• No sampling planned	Existing data are of sufficient quantity and quality to provide adequate coverage.
1c	Trash Burn Pits	No additional sampling necessary; existing data base sufficient for risk assessment.	• No sampling planned	Existing data are of sufficient quantity and quality to provide adequate coverage.
1d	Propellant Burn Pans	No additional sampling necessary; existing data base sufficient for risk assessment.	• No sampling planned	Past and present propellant burning activities have caused a release of hazardous constituents (metals and explosives) to surrounding surface soils. Because as a n interim RCRA permitted facility, additional sampling and characterization will be conducted upon closure, no sampling is planned.
20	AED Deactivation Furnace Site	Investigate areal and vertical extent of contamination originating from activities at this site; provide data for subsequent risk assessment	• Drill 19 3-ft. deep soil borings and collect three samples from each (57 total); analyze samples for metals and explosives.	Surface runoff and wind may have transported hazardous constituents laterally and vertically from the facility.
			• Drill 2 3-ft. deep soil borings and collect 2 samples from each for metals.	Establish site-specific background metals concentrations.

AED	Ammunition Equipment Directorate	SVOC	Semi-Volatile Organic Compound
BTEX	Benzene, toluene, ethylbenzene, xylenes	SWMU	Solid Waste Management Unit
PCB	Polychlorinated biphenyl	TPH	Total petroleum hydrocarbon
PCDD	Pentachlorodibenzodioxin	VOC	Volatile Organic Compound
PCDF	Pentachlorodibenzofuran	XRF	X-ray fluorescence

TABLE A-1

PHASE II RFI FIELD SAMPLING PROGRAM SUMMARY - GROUP A SUSPECTED RELEASES SWMUs
(CONTINUED)

SWMU Number	Site Name	Sampling Objective	Program Scope	Rationale
20	AED Deactivation Furnace Site (con't)		• Collect eight surface soil samples.	Provide data to accurately evaluate presence of Chromium VI and, if present, its areal extent. Investigate presence/absence of dioxins/furans.
21	Deactivation Furnace Building	Investigate water supply for stock and native wild animals.	• Collect one surface water and two sediment samples from a watering trough and wet area, and analyze for metals, explosives, PCDD/PCDF	Released constituents may have affected a nearby wet area where wildlife gather.
		Investigate amount of chromium present in hexavalent state in surface soils at SWMU 21.	• Collect four surface soil samples from previous sample locations with elevated CXr concentrations; submit samples for total chromium and hexavalent chromium analysis.	Define how much chromium is present as hexavalent chromium for risk assessment purposes.
34	Pesticide Handling and Storage Area	Investigate areal and vertical extent of contamination originating from activities at this site; provide data for the risk assessment	• Drill eight 3-ft. soil borings and collect three samples from each (24 total); analyze for metals and pesticides	Contaminants released by pesticide handling and mixing activities at the facility have released hazardous constituents to the nearby soils which may have migrated horizontally and vertically.
			• Drill 1 3-ft. soil boring and collect three samples for TRPH.	Investigate petroleum hydrocarbons in the vicinity of an above-ground fuel storage tank.
			• Drill 3 20- ft. borings and collect five samples from each (15 total); analyze for metals and pesticides, with five samples analyzed for BTEX compounds.	Possible deep migration of contaminants from outfall areas may have occurred due to driving force of liquid infiltration.

AED	Ammunition Equipment Directorate
BTEX	Benzene, toluene, ethylbenzene, xylenes
PCB	Polychlorinated biphenyl
PCDD	Pentachlorodibenzodioxin
PCDF	Pentachlorodibenzofuran
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TPH	Total petroleum hydrocarbon
VOC	Volatile Organic Compound
XRF	X-ray fluorescence

TABLE A-1

PHASE II RFI FIELD SAMPLING PROGRAM SUMMARY - GROUP A SUSPECTED RELEASES SWMUs (CONTINUED)

SWMU Number	Site Name	Sampling Objective	Program Scope	Rationale
34	Pesticide Handling and Storage Area (con't)		• Drill 2 3-ft. deep soil borings and collect 2 samples from each for metals.	Establish site-specific background metals concentrations.
37	Contaminated Waste Processing Plant	Investigate areal and vertical extent of contamination originating from activities at this site; provide data for the risk assessment	• Collect 8 surface soil samples and analyze for PCDD/PCDF and SVOCs • Drill 7 3-ft. soil borings and collect three samples from each (21 total); analyze for PCDD/PCDF and SVOCs	Nearby soils have been affected by hazardous constituents released by site activities, and may pose a health and environmental risk.
			• Drill 2 3-ft. deep soil borings and collect 2 samples from each for metals.	Establish site-specific background metals concentrations.
42	Bomb Washout Building	Investigate, by field screening and lab analysis, the surface and subsurface extent of metals and explosives soil contamination caused by the previous demilitarization furnaces. Investigate, by geophysical methods and test pits, the possibility of buried debris in an open field near the previous locations of four demilitarization furnaces; provide data for the risk assessment.	• Conduct an XRF field survey for lead; field screen approximately 150 soil samples	Time-efficient field screening of large areas for potential contamination will allow efficient siting of surface and subsurface soil samples.
			• Drill 20 5-ft. soil borings and collect two samples from each (40 total); analyze for metals and explosives. Analyze two of these 5 ft. borings for metals, VOCs, and SVOCs	Examine surface and subsurface soils around the site for extent of contaminants from airborne releases. Investigate area near Building 520 for possible solvent contamination.

AED Ammunition Equipment Directorate
BTEX Benzene, toluene, ethylbenzene, xylenes
PCB Polychlorinated biphenyl
PCDD Pentachlorodibenzodioxin
PCDF Pentachlorodibenzofuran
SVOC Semi-Volatile Organic Compound
SWMU Solid Waste Management Unit
TPH Total petroleum hydrocarbon
VOC Volatile Organic Compound
XRF X-ray fluorescence

TABLE A-1

PHASE II RFI FIELD SAMPLING PROGRAM SUMMARY - GROUP A SUSPECTED RELEASES SWMUs
(CONTINUED)

SWMU Number	Site Name	Sampling Objective	Program Scope	Rationale
42	Bomb Washout Building (con't)		• Drill 12 borings to 10 ft and collect four samples from each (48 total); analyze for metals	Deeper soils in area of former washout pond have been affected by infiltration of surface effluent and runoff carrying metals.
			• Drill four 100-ft. borings and collect five samples from each (20 total); analyze for metals and explosives	Existing surficial metals contamination could be transported by local winds, and may pose a health threat.
			• Collect 8 air filter samples over two rounds of air monitoring at four locations	Existing surficial metals contamination could be transported by local winds, and may pose a health threat.
			• Collect one surface soil sample for metals analysis.	Establish site-specific background metals concentrations
			• Drill 3 3-ft. deep soil borings and collect 2 samples from each for metals.	Establish site-specific background metals concentrations.
			• Conduct approximately 60,000-80,000 line feet of portable magnetometer and terrain conductivity surveys.	Allow delineation of areas where furnace waste or other debris may have been disposed of by burial; provide accurate location of subsequent exploration test pits.

AED Ammunition Equipment Directorate
BTEX Benzene, toluene, ethylbenzene, xylenes
PCB Polychlorinated biphenyl
PCDD Pentachlorodibenzodioxin
PCDF Pentachlorodibenzofuran
SVOC Semi-Volatile Organic Compound
SWMU Solid Waste Management Unit
TPH Total petroleum hydrocarbon
VOC Volatile Organic Compound
XRF X-ray fluorescence

TABLE A-1

PHASE II RFI FIELD SAMPLING PROGRAM SUMMARY - GROUP A SUSPECTED RELEASES SWMUs
(CONTINUED)

SWMU Number	Site Name	Sampling Objective	Program Scope	Rationale
42	Bomb Washout Building (con't)	Investigate the possibility of subsurface contamination due to buried debris.	• Excavate and log seven 6-10 foot deep test pits and collect two samples from two of them (four total); analyze for metals and explosives.	Past disposal practices at SWMU 42 may have included burial of furnace or other debris. Directly observe and sample any discovered subsurface debris.
			• Collect six surface soil samples.	Provide data to accurately evaluate presence of Chromium VI and, if present, its areal extent. Investigate presence/absence of dioxins/furans.
45	Stormwater Discharge Area	Investigate if stormwater discharges have impacted the local groundwater; investigate the integrity of the stormwater system in the vicinity of the 500-Series Buildings, which drains to the Stormwater Discharge Area; determine if this system has released contaminants to the underlying soils; provide data for the risk assessment	• Drill, construct, and develop two new 300-ft. (approx.) deep monitoring wells	Water infiltration may have transported hazardous constituents downward to the local groundwater.
			• Conduct two rounds of groundwater sampling at the two new wells and one existing nearby monitoring well; analyze for VOCs, SVOCs, metals, explosives, and pesticides	
			• Conduct slug tests and groundwater elevation measurements on the new wells	Local aquifer characteristics and flow direction will determine degree and direction of contaminant transport.
			• Conduct a remote video camera survey of approximately 10,000 feet of stormwater line and review resulting tape for possible damaged or separated line sections that may leak.	Inspect stormwater lines; allow accurate siting of subsequent boreholes along suspect sections of lines.

AED	Ammunition Equipment Directorate	SVOC	Semi-Volatile Organic Compound
BTEX	Benzene, toluene, ethylbenzene, xylenes	SWMU	Solid Waste Management Unit
PCB	Polychlorinated biphenyl	TPH	Total petroleum hydrocarbon
PCDD	Pentachlorodibenzodioxin	VOC	Volatile Organic Compound
PCDF	Pentachlorodibenzofuran	XRF	X-ray fluorescence

TABLE A-1

PHASE II RFI FIELD SAMPLING PROGRAM SUMMARY - GROUP A SUSPECTED RELEASES SWMUs
(CONTINUED)

SWMU Number	Site Name	Sampling Objective	Program Scope	Rationale
45	Stormwater Discharge Area (con't)		• Based on the video survey, locate, drill, and sample 15 10-foot soil borings along suspect areas of the stormwater line. Collect two samples from each boring (40 total) and analyze for VOCs, SVOCs, TPH, pesticides/PCBs, and metals.	Investigate whether broken or separated sections of the stormwater line have released contaminants to the underlying soils.
48	Old Dispensary Discharge, Building 400	Investigate if waste from x-ray development facilities in previous dispensary, or other wastes, were disposed of in the nearby stormwater system.	• Drill and sample two 10-foot soil borings at the stormwater system outfall locations north and east of the former Building 400 location; collect two samples from each boring (four total) and analyze for VOCs, SVOCs, TPH, and metals.	Nearby stormwater system may have been used for disposal of hazardous constituents generated in the former TEAD dispensary; these constituents would have traveled to the outfalls and infiltrated into the soil.

AED Ammunition Equipment Directorate
BTEX Benzene, toluene, ethylbenzene, xylenes
PCB Polychlorinated biphenyl
PCDD Pentachlorodibenzodioxin
PCDF Pentachlorodibenzofuran
SVOC Semi-Volatile Organic Compound
SWMU Solid Waste Management Unit
TPH Total petroleum hydrocarbon
VOC Volatile Organic Compound
XRF X-ray fluorescence

- The field trailer was stocked with office supplies and other necessary equipment. The trailer was equipped with telephone service, a fax machine, and a copier. A portable outhouse was also delivered to the field trailer location.

- Field equipment such as field vehicles, sampling equipment, health and safety monitoring devices, cellular phones, etc., was gathered and transported to the Montgomery Watson office trailer at TEAD-N.

- The necessary utility clearances, excavation permit, and wastewater discharge permit were obtained from the appropriate Depot agencies.

- A monitoring well construction permit was obtained from the State of Utah Division of Water Rights for the two new monitoring wells at TEAD-N.

A.4.2. Open Burning/Open Detonation Areas (SWMU 1, 1a, 1b, 1c, 1d)

A.4.2.1. The interim RCRA permit under which the OB/OD Area facility operates requires sampling for environmental contamination upon facility closure. Therefore, the only activities conducted during the Phase II RFI at the OB/OD areas included collection of four surface soil samples for total chromium and hexavalent chromium analysis, and an ecological survey of the local flora and fauna was conducted to provide information to support the risk assessment.

A.4.3. AED Deactivation Furnace Site (SWMU 20)

A.4.3.1. Introduction. Phase I RFI sampling indicated contamination by metals and explosives on the ground surface were derived from activities at SWMU 20. Additional sampling was conducted by Team A on November 2-4, 1993, to help delineate the vertical and horizontal extent of this contamination and evaluate whether some of the contamination had been released as airborne stack emissions, as well as to gather more site-specific data on background metals concentrations. Overland Drilling provided drilling support at SWMU 20.

A.4.3.2. Scope of the Investigation. Twenty-one 3-foot soil borings were sited around the AED Deactivation Furnace Site. Nineteen borings were sited to investigate the possibility that contaminants have migrated horizontally due to surface water runoff or wind, and to determine if subsurface infiltration of hazardous constituents has occurred in areas where Phase I sampling showed surface contamination. Three samples per boring were collected, for a total of 57 samples. Two borings were placed in areas judged to be unaffected by the SWMU 20 activities to provide information on background metals concentrations in the soil. These two borings were sampled from 1 to 2 feet bgs and 2 to 3 feet bgs, for a total of four samples.

A.4.3.3. Analytical Program. All soil samples were analyzed for TAL metals and explosives with the exception of the four background soil samples which were only analyzed for TAL metals. The August 1995 samples were analyzed for chromium, hexavalent chromium, and dioxins/furans. In August 1995, eight additional surface soil samples were collected for chromium/hexavalent chromium and dioxin/furan analyses.

A.4.4. Deactivation Furnace Building (SWMU 21)

A.4.4.1. Introduction. Data collected during the Phase I RFI indicated elevated concentrations of metals, dioxins/furans, explosives, as well as trace amounts of VOCs and SVOCs, in the surface soil surrounding SWMU 21. As is the case with the OB/OD Area SWMUs, the RCRA permit that governs this facility requires sampling for environmental contamination upon facility closure. Consequently, no soil sampling was conducted during the Phase II RFI. However, a watering trough and related wet area were sampled by Team A on October 7, 1993 to evaluate the potential risks to local wildlife that may use this water source. In addition, four surface samples were collected on June 9, 1994 for total chromium and hexavalent chromium speciation to help aid in the risk assessment evaluation.

A.4.4.2. Scope of the Investigation. One surface water sample was collected from the cattle and wildlife water trough that is fed by the TEAD-N water supply. Two sediment samples were also collected from a related wet area. Sediment sample locations were evenly distributed throughout the wet area as determined by Montgomery Watson personnel in the field. The four surface soil samples were collected from areas of known chromium contamination.

A.4.4.3. Analytical Program. Sediment samples were analyzed for metals, explosives, and dioxins/furans, and surface soil samples were analyzed for total chromium and hexavalent chromium.

A.4.5. Pesticide Handling and Storage Area (SWMU 34)

A.4.5.1. Introduction. Data from the Phase I RFI indicated elevated concentrations of pesticides, herbicides, and metals in the surface soil surrounding SWMU 34, which result from past practices at the facility. To further define the areal and vertical extent of these contaminants, field Team A collected additional soil samples during the period from October 23 through November 2, 1993.

A.4.5.2. Scope of Investigation. Locations for shallow 3-foot borings were chosen to provide general areal coverage around SWMU 34. Three 20-foot borings were sites to investigate the specific areas noted below. Overland Drilling provided drilling services for the following sampling activities:

- Drilling nine 3-foot borings at locations along the perimeter of the facility, and collecting three samples per boring (27 samples total).

- Drilling three 20-foot borings at locations adjacent to the outfall pipe, the mixing sink catch tanks, and beneath the concrete spill basin, and collecting five samples per boring (15 samples total).

- Drilling two 3-foot borings at locations distant from SWMU 34 activities, but within the same soil type, and collecting two samples per boring for information on background metals concentrations (four samples total).

A.4.5.3. Analytical Program. The nine borings placed around the facility perimeter were analyzed for TAL metals and pesticides, and three of these surface samples were submitted for TRPH analysis. All samples collected from the 20-foot borings were analyzed for TAL metals and organochlorine pesticides. In addition, five of these samples were analyzed for BTEX based on PID readings and soil appearance. The two background borings were submitted for metals analysis.

A.4.6. Contaminated Waste Processing Plant (SWMU 37)

A.4.6.1. Introduction. Various contaminants were detected in surface soils at SWMU 37 during the Phase I RFI, including dioxins/furans and several SVOCs. To further define the areal and vertical extent of contamination, field Team A collected soil samples from several surface and shallow boring locations on October 5 and 6, 1993.

A.4.6.2. Scope of Investigation. Eight surface soil samples were collected from around the perimeter of the Contaminated Waste Processor Facility. Samples were located 500 feet from the facility along the eight compass directions (i.e., N, NE, E, SE, S, SW, W, and NW). The 500-foot distance was intended to eliminate the possibility of contamination by surface runoff, but give an indication of airborne transport from the facility. In addition, seven 3-foot soil borings were advanced with a hand auger. These borings were placed in drainage areas that would receive surface water runoff or wastewater from the facility. Three samples were collected from each of these borings. Two 3-foot soil borings were also hand augered at distant (background) locations, and two samples were submitted per borehole.

A.4.6.3. Surface soil samples were collected within the top two inches of soil. Each surface sample was collected from five aliquots evenly distributed on a five foot radius from the central sampling location. This technique distributes each sample over a larger sampling area, providing a more representative measure of average soil conditions.

A.4.6.4. Hand auger samples were collected with a decontaminated, stainless steel, 3-inch diameter bucket auger. Samples were collected from the intervals 0-1, 1-2, and 2-3 feet bgs.

A.4.6.5. Analytical Program. All of the soil samples collected at SWMU 37 were analyzed for dioxins/furans and SVOCs with the exception of the two background samples which were submitted for metals analysis only.

A.4.7. Bomb Washout Building (SWMU 42)

A.4.7.1. Introduction. Data generated from the Phase I RFI indicated that a release of contaminants to surface and subsurface soils has occurred at SWMU 42. To characterize the lateral and vertical distribution of contaminants and evaluate if a potential for groundwater contamination, surface, shallow, and deep soil samples were collected

during the field investigation. Field Team A collected surface and shallow soil samples during October 7-14 and 19-23, 1993. Field Team B conducted a deep subsurface soil investigation on November 3-6 and 8, 1993. In addition, meteorological monitoring and air sampling were conducted during the period from October 8 through December 7, 1993 to assess the current potential for airborne releases of contaminants from contaminants from soils at the site.

A.4.7.2. Field observations made during the Phase II activities in October 1993 results in additional field activities at SWMU 42 in April and May of 1994. A geophysical investigation and a test pit excavation and sampling program were conducted to explore the possibility that subsurface debris might be present in an open field west and north of Building 539.

A.4.7.3. Scope of Investigation. The following sampling activities were conducted at SWMU 42 during the Phase II RFI:

- A field XRF screening program was conducted on 150 soil samples to aid in delineating metals contamination of the surface soils and to assist in siting the shallow soil borings.

- Eight surface soil samples were collected for metals analysis to serve as laboratory confirmation and to provide calibration samples for the XRF instrument.

- Six surface soil samples were collected for chromium and hexavalent chromium analysis to estimate the percentage of chromium present in the hexavalent state.

- Three surface soil samples were collected for dioxin/furan analysis to investigate the areal distribution of these isomers.

- One surface soil sample was collected from a location distant from SWMU 42, but in the same soil type, to provide information on background metals concentrations in the surface soils.

- Three 3-foot soil borings were drilled at locations judged to be distant from the contamination at SWMU 42 for background metals analysis.

- Two 3-foot borings were placed along the edge of the asphalt west of the northern portion of Building 520 to investigate possible solvent disposal at this location.

- Eighteen 5-foot borings were drilled to investigate the horizontal and vertical extent of contamination from past furnace activities.

- Twelve 10-foot borings were located on either side of the discharge ditch and holding pond to further characterize the horizontal subsurface migration of contaminants from these source areas.

- Four 100-foot borings were placed in the wastewater ditch and holding pond to investigate the depth of contaminant migration due to infiltration from these sources.

- Four air monitoring stations were established with air sampling was conducted over a period of two months. Each month's samples were composited for each station (eight samples total).

- Approximately 100,000 line feet of traverses were made using a portable magnetometer, non-ferrous metal detector, and terrain conductivity equipment to investigate the possibility of subsurface debris in an approximately 35-acre area near Building 539.

- Seven approximately 10-foot deep test pits were excavated to explore subsurface anomalies detected during the geophysical traverses. Two soil samples were collected from two of these test pits (four samples total) and submitted for metals and explosives analyses.

A.4.7.3. Analytical Program. With the exception of the XRF soil samples that were screened for metals in the field, all of the soil samples collected at SWMU 42 were submitted to the laboratory for metals or dioxin/furan analysis. The two 3-foot borings placed along the edge of asphalt west of the northern portion of Building 520 were also samples for VOCs and SVOCs. In addition, the 18 5-foot borings, and four 100-foot borings, and the test pit soil samples were also sampled for explosives. The eight composite air samples were analyzed for TAL metals.

A.4.8. Stormwater Discharge Area (SWMU 45)

A.4.8.1. Introduction. Preliminary samples taken in 1990 from the Stormwater Discharge Area by the TEAD-N EMO revealed the presence of VOCs in surface water and sediments. Phase I RFI sampling in 1992 found trace amounts of 2,4-DNT, arsenic, toluene, and phthalates in the surface water, and elevated concentrations of several metals and pesticides in the sediment. To assess whether the continuous ponding of stormwater runoff and other effluents at this area has impacted the local groundwater, field Team B conducted a groundwater investigation during October-November 1993. In addition, a video pipeline survey was conducted on the stormwater pipeline that leads from the Pesticide Handling and Storage Area (SWMU 34) to the Stormwater Discharge Area (SWMU 45). The purpose of this survey was to inspect the interior of the pipe and assess the potential for contaminants due to breaks in the pipeline. After the Stormwater Pipeline Survey was completed, the video was reviewed and soil sampling investigation was conducted to assess areas suspected of leaking. Drilling services at this SWMU were provided by Layne for the groundwater investigation and by EarthTech drilling for the pipeline soil sampling investigation. Pipeline video inspection services were provided by Roto-Rooter.

A.4.8.2. Scope of Investigation. Two new groundwater monitoring wells were drilled, constructed, and developed at SWMU 45. Well N-142-93, set at a depth of 377 feet bgs, was placed to monitor groundwater conditions upgradient of the stormwater discharge pond. Well N-143-93, set at a depth of 346 feet bgs, was sited to monitor groundwater conditions downgradient of the stormwater discharge pond. Permeability tests were conducted on both wells, and two rounds of groundwater samples were collected from the two new wells and existing well T-7, also located downgradient of the stormwater discharge pond.

A.4.8.3. The stormwater pipeline that runs between SWMU 34 and SWMU 45 was surveyed in November, 1993. The remaining portions of the stormwater pipelines at SWMU 45 were surveyed in May, 1994. The survey was performed by Roto-Rooter with a video camera designed to operate inside of pipelines. The camera is track mounted and is operated electronically from outside the pipe. The camera is placed inside the pipeline through manhole access, and is limited in the distance it can travel by the electronic control cable which is pulled behind the track as it moves down the pipeline,. When the length of cable runs out, the camera is pulled back out and the survey proceeds again

from another manhole down the line. This process produces a color video of the pipeline, with a running total of the footage traveled displayed at the bottom of the screen. This allows cracks or breaks in the pipeline to be located at the ground surface by measuring distances from each manhole.

A.4.8.4. Fifteen soil borings were drilled at points along the stormwater drainage system. The boring locations were drilled adjacent to the storm drain in areas identified from the video survey as having cracks or breaks in the pipeline, or areas where the pipeline may have separated. Two soil samples were collected from each boring from beneath the pipeline, for a total of 30 samples. The depths of the borings ranged from 10 to 12 and one-half feet bgs.

A.4.8.5. Analytical Program. Groundwater samples from the three monitoring wells were analyzed for VOCs, SVOCs, pesticides, explosives, metals, and anions. Each soil sample from the 15 soil borings was analyzed for VOCs, SVOCs, pesticides, TRPH, and metals.

A.4.9. Old Dispensary Discharge–Building 400 (SWMU 48)

A.4.9.1. Introduction. The former TEAD-N Dispensary, which was demolished in the mid-1980s, was located near the location of the present TEAD-N Clinic. This facility contained two x-ray operations that discharged to the sanitary sewer system. Because some of the waste from this building may have been disposed of into the nearby stormwater system, shallow soil at the stormwater outfalls for this system was sampled.

A.4.9.2. Scope of Investigation. Two 10-foot soil borings were drilled at the outfall locations. Two soil samples were collected from each boring, for a total of four samples.

A.4.9.3. Analytical Program. All soil samples were analyzed for VOCs, SVOCs, TRPH, pesticides/PCBs, and metals.

A.5 PROGRAM-WIDE INVESTIGATIONS

A.5.0.1. In addition to the field activities performed to characterize contamination at specific SWMUs at TEAD-N, the field program included several other field activities. The following sections describe these activities, and also discuss soil geotechnical analyses, decontamination procedures, and investigation-derived waste handling.

A.5.1. TEAD-N Ecological Survey

A.5.1.1. On October 12 and 13, 1993, Montgomery Watson personnel conducted a site visit to each SWMU to characterize major vegetation types and perform field observations of fauna species. This information was gathered as part of the risk assessment for each of the eight Group A SWMUs. A risk assessment of each SWMU is included in the SWMU-specific text sections of this report (Volume I).

A.5.2. Topographic Survey

A.5.2.1. The topographic survey was conducted by CRS personnel on November 23, 1993. Points surveyed included the four air monitoring stations at SWMU 42, the two newly constructed monitoring wells at SWMU 45, and the four 100-foot soil borings at SWMU 42. All survey data were presented in terms of the Utah State plane coordinate system for entry into the IRDMIS database. All survey data is included in Appendix I.

A.5.3. Soil Geotechnical Analyses

A.5.3.1. Approximately 12 percent of the soil samples collected during the RFI were submitted to the geotechnical laboratory of Dames and Moore in Salt Lake City, Utah, for geotechnical analyses, including grain-size analysis (to confirm on-site USCS soil characterizations), specific gravity, and Atterberg limits. Appropriate American Society for Testing and Measures (ASTM) methods were used for these analyses. A summary of the geotechnical testing program results is included as Appendix J.

A.5.4. Decontamination Procedures

A.5.4.1. To prevent cross contamination and to protect the field sampling personnel, downhole drilling equipment and all sampling equipment were decontaminated before use and at the completion of each soil boring or sampling episode. Decontamination consisted of steam-cleaning at a decontamination pad constructed specifically for this purpose.

A.5.4.2. The decontamination pad was constructed from flexible 60-mil thick high-density polyethylene (HDPE) on a sloping sand base that drained to a sump at one end. The pad was large enough to accommodate the largest on-site vehicle that required

decontamination. Decontamination of sampling equipment and smaller drilling tools was performed inside a temporary decontamination station that consisted of a galvanized steel water thank. All water used in the decontamination process came from the approved water source. Decontamination water collected in the sump or temporary decontamination station was pumped into a trailer-mounted 500-gallon poly tank and transported to the IWTP for disposal.

A.5.4.3. The pumps used to purge the wells during development and sampling were decontaminated by steam cleaning as described in the preceding paragraphs, and by pumping three volumes (sum of pump volume and discharge tubing volume) of water from an USAEC-approved source through the systems. All rinsate was collected for disposal at the IWTP.

A.5.4.4. Following each use, the groundwater-level probe and attached cable were wiped dry with a clean paper towel. The probe and lower 5 feet of the cable were rinsed three times with distilled water, and wiped dry with a clean paper towel before being used at the next well. All rinsate was contained in buckets for later transfer to the IWTP.

A.5.5. Investigation-Derived Waste Handling

A.5.5.1. Because the field sampling program was extensive, significant quantities of investigation-derived wastes (IDWs) were generated, including soil from shallow and deep soil borings, and water from monitoring wells and steam cleaning activities. This subsection describes Montgomery's approach to handling these IDWs.

A.5.5.2. Drill Cuttings. Dry cuttings were inspected for visible contamination and soil samples were screened using a PID. The soil cuttings and excess soil from soil samplers were left at the site. In the borings, auger cuttings and excess soil samples were used as backfill material.

A.5.5.3. Because both wells constructed for the Phase II RFI field program at SWMU 45 were located outside the proposed SWMU boundary, dry cuttings were inspected and screened for contamination, and unless contamination was suspected, spread on the ground. When the water table was encountered, saturated cuttings were placed in 55-gallon steel drums. The drums were placed on hardwood pallets, labeled as per the TEAD waste tracking program, and transported to the TEAD 90-day yard within

72 hours pending laboratory results of toxicity characteristics on soil samples collected from the drums. All drums left overnight on site were locked.

A.5.5.4. Purged Groundwater From Wells. Purge water collected from monitoring wells was temporarily contained in a 500-gallon poly tank for discharge at the IWTP.

A.5.5.5. Decontamination Rinse Water. Decontamination rinse water was captured both at the decontamination pad and at temporary decontamination stations and contained in a 500-gallon poly tank following each use. All decontamination liquid was discharged to the IWTP.

A.5.5.6. Hazardous/Non-Hazardous Designation and Waste Disposition. All IDW drums were sampled for TCLP analysis before transport to and storage in the TEAD-N 90-day Storage Yard. These analyses were used to determine whether the material in the drums was hazardous or non-hazardous. The results indicated all constituents were below TCLP limits (i.e., the material was non-hazardous), and the drums were taken from the 90-Day Storage Yard and emptied onto the ground surrounding the boring they were derived from, as directed by TEAD-N Environmental Management Office (EMO) personnel.

A.6 HEALTH AND SAFETY PROGRAM

A.6.0.1. Due to the potential for encountering hazardous materials during invasive field activities at TEAD-N, the Health and Safety program was a major component of the project. The purpose of the Health and Safety Program was to provide the field investigation personnel, including subcontractors, with a safe working environment during field activities at TEAD-N.

A.6.1. General Health and Safety Procedures

A.6.1.1. The following project-wide health and safety procedures were followed during the field investigation:

- All Montgomery Watson employees and subcontractor personnel were required to be current with respect to OSHA hazardous waste site worker training requirements as stated in 29 CFR 1910.120. All on-site employees

were also required to be participants in their respective employers' medical surveillance programs.

- All personnel were required to attend a daily tailgate safety meeting, conducted by the On-site Safety Officer (OSO) or designate. Written documentation, including the signatures of all attendees, was maintained.

- A written log was kept of calibrations of all instruments used to monitor a site for health risks.

- Applicable personal protective equipment (PPE) was utilized according to the site activity. This is described in more detail in the next sections.

- Air was continuously monitored at all sites where VOCs were suspected to be present. The monitoring program used a PID to indicate the presence of health-endangering organic vapors. In addition, each field team was equipped with a Miniram PDM-3 respirable dust monitor to measure respirable dust levels in the work zone. Table 6-1 in the HASP (MW, 1993c) lists those levels of dust and organic vapors that require an upgrade in PPE. During the field investigation activities, organic vapors were not detected that required an upgrade in PPE. Applicable instrument readings were taken at 15-minute intervals during field activities, and recorded on dedicated forms.

- Boreholes were monitored for the presence of explosive vapors using a portable Combustible Gas Indicator. No detectable explosive vapors were encountered during field activities.

- Noise was monitored periodically during high noise-generating site activities such as drilling. A noise dosimeter was used to check for time-weighted average exposures greater than 85 dBA, which would require mandatory use of hearing protection devices. Noise levels during percussion hammer drilling routinely exceeded the 85 dBA level, and hearing protection was worn by all involved personnel during drilling of the deep boreholes.

- The "buddy system" was used during all field activities in areas where contamination was suspected. This kept each field individual within visual range of another person, insuring rapid response to any medical emergency.

- Emergency response phone numbers and maps showing the most expedient routes to emergency medical facilities were kept in each field vehicle and in the office trailer.

- Level C PPE was maintained on site for all field team and subcontractor personnel where an upgrade in PPE might be necessary. This included Tyvek outerwear, Tyvek or rubber boots, rubber gloves, and a full- or half-face respirator equipped with the appropriate cartridges. All field personnel had been fit-tested with their individual respirators.

- As per TEAD-N Safety Program requirements, equipment worn by individuals engaged in steam-cleaning activities included a waterproof suit with hood, earplugs or earmuffs, a face shield plus safety glasses, insulated rubber gloves, and butyl rubber safety boots.

A.6.2. Soil Sampling Procedures

A.6.2.1. Contamination routes associated with soil sampling activities, and protective measures instituted during the investigation to minimize exposure to contaminants during these activities, were as follows:

- **Dust Inhalation.** Dust stirred up by digging or coring into the soil, or by wind, can contain contaminants, and be inhaled into the lungs. To monitor the inhalation hazard, a Miniram PDM-3 respirable dust monitor was worn by one member of each field team. The readings were observed continuously, and recorded at 15-minute intervals. Readings above a certain threshold value would require an upgrade in PPE to Level C, including full- or half-face respirators. Conditions encountered during the Phase II investigation did not require a Level C upgrade in PPE.

- **Vapor Inhalation.** Volatile contaminants in the soil could pose a potential health risk if encountered during soil sampling activities. To monitor this possible exposure route, each field team carried a PID. Readings were recorded every 15 minutes. Organic vapor levels at, or above, the designated threshold values would require upgrading of PPE to Level C. Organic vapor levels requiring an upgrade of PPE to Level C were not encountered.

- **Skin Contact.** As with the inhalation hazard, dust stirred up by wind or sampling activities can also come in contact with exposed skin. As previously mentioned, a Miniram portable dust monitor was worn by a member of each field team to monitor this airborne dust hazard. Also, soil sampling activities can cause direct contact of the hands and forearms with the soil being sampled. To alleviate this contact hazard, disposable rubber gloves and long-sleeved shirts were worn during soil sampling activities.

A.6.2.2. In general, Level D protection was required for all soil sampling activities. This included steel-toed work boots, long pants, long-sleeved shirts, and safety glasses. The added protection of polycoated Tyvek coveralls was required for soil sampling at SWMU 34, the Pesticide Handling and Storage Area, due to the increased possibility of encountering volatile and semi-volatile pesticide residues in the sampled soil.

A.6.3. Water Sampling Procedures

A.6.3.1. Water-borne contaminants present during water sampling activities at TEAD-N could pose a health threat to team members engaged in surface water or groundwater sampling activities. To minimize contact with possible contaminants, the following measures were observed for their respective exposure routes:

- **Vapor Inhalation.** As ground water or surface water is disturbed in the process of collecting a water sample, vapor concentrations of any volatile constituents in the water could be increased locally. This could pose an inhalation hazard to any field team member collecting the sample. To monitor this exposure route, each field team carried a PID which was continuously monitored while engaged in water sampling at all SWMUs. Readings were recorded on a Daily Health and Safety Log at 15-minute intervals while the field team was at the SWMU. Threshold readings for organic vapors at the various SWMUs were generated, and appear as Table 6.1 in the HASP (Montgomery Watson, 1993c). Readings at or above these threshold values would require an upgrade to Level C PPE, including a half-face or full-face respirator equipped with approved organic vapor cartridges. No such conditions were encountered during Phase II RFI field activities.

- **Skin Contact.** Because the process of obtaining a surface-water or groundwater sample can involve splashing, spilling, or immersion of hands in the water, physical contact with contaminated water was considered a possible exposure route. To prevent possible contact of skin with contaminated water during the sampling process, Level D protection was supplemented with polycoated Tyvek coveralls, plus nitrile gloves.

A.6.4. Potential UXO Areas/Procedures

A.6.4.1. Because there was a possibility of encountering UXO during field activities at the OB/OD Area, procedures designed to minimize the health and safety risks associated with UXO were instituted at that site. These procedures were expanded to include SWMU 42 after ordnance items were encountered during initial field activities conducted at that SWMU.

A.6.4.2. Field Escort. Field activities requiring any Montgomery Watson field team member or subcontractor to leave established roads in the OB/OD area required an escort by UXB subcontractor personnel. This was necessary only for the ecological survey, as this was the only activity that was conducted off of established roads in the OB/OD area during the Phase II RFI.

A.6.4.3. UXO Geophysical Activities. Surface sweeps for UXO were conducted by UXB personnel during OB/OD Area ecological survey activities. After potential UXO was encountered during the initial sampling activities at SWMU 42, surface sweeps were conducted prior to further activities at this SWMU as well. In addition to visual surface inspection, the following types of electronic metal detection equipment were used:

- The Foerster Ferex Electromagnetic Detector, a military approved locator used by U.S. military explosives ordnance disposal (EOD) forces under designation as the ML 26 Ordnance Locator. This locator was used for surface sweeps, and was the primary location instrument in use during field activities.

- The White's Eagle II Metal Detector contains a transmitter coil which operates on the induction principle. The advantage of the White's is its ability to detect both ferrous and non-ferrous metals.

A.6.4.4. Because large areas of the OB/OD Area were littered with metal fragments from past demilitarization activities, the effectiveness of the geophysical location equipment was decreased. Interference from surface "frag" made it difficult to detect the actual ordnance items. Because of this, visual surface clearing for munition metal parts was generally used by UXB personnel to ensure safe surface passage of individuals and equipment.

A.7 SAMPLE COLLECTION, HANDLING, AND SHIPPING

A.7.0.1. The goal of any field sampling operation is to obtain samples that will yield meaningful analytical results; i.e., they are precise, representative, accurate, comparable, and complete. An important part of ensuring data meet these criteria are the sample handling procedures used to transmit the respective samples from sampling medium to the analytical laboratory.

A.7.1. Sample Collection

A.7.1.1. Soil and Sediment Samples. Soil and sediment samples collected at the various sampling sites were placed into commercially available stainless steel bowls and stirred with the stainless steel sampling implement (spoon or trowel) to homogenize the sample. The homogenized samples were placed directly into analyte-specific sample containers. If the sample also was to be submitted for volatile organic compounds (VOC) analysis, an aliquot of undisturbed soil (prior to homogenization) was placed into 60 ml amber glass jars with Teflon-lined caps. These 60 ml jars for VOC analysis were filled completely, so that no void space was left between sample and cap.

A.7.1.2. After sample aliquots were collected in the appropriate sample containers and labeled, the soil remaining in the stainless steel bowl was characterized according to the Unified Soil Classification System (USCS).

A.7.1.3. Surface Water and Groundwater Samples. Three types of sample containers were used to collect water samples during the field investigation. Table 5-4 in the DCQAP lists the analyses for each type of container.

- 1 liter amber glass jars
- 1 liter plastic cube containers
- 40 ml amber glass bottles with Teflon septa exposed on the lid

A.7.1.4. All water sample containers were first triple rinsed with sample water prior to filling, and then filled completely to the top. For VOC samples, the sample container was turned upside down after securing the lid, and the sample was checked for air bubbles. If bubbles were detected, the sample containers were refilled until they were void of all air bubbles.

A.7.1.5. Water samples were preserved in the field at the time of sample collection, if required. Table 5-4 in the DCQAP (Montgomery Watson, 1993a) shows the appropriate preservative for each analyte.

A.7.1.6. The pH, conductivity, turbidity, and temperature of all collected water samples were measured at the time of sampling, and all measurements were recorded on the Groundwater/Surface-Water Sampling Log.

A.7.2. Sample Handling and Shipping

A.7.2.1. The sample containers used for the investigation were provided by ESE Laboratories of Gainesville, Florida, and by DataChem Laboratories of Salt Lake City, Utah; the analytical subcontractors for the project. They consisted of pre-cleaned amber glass I-Chem bottles with Teflon-sealed plastic lids. The sizes used during the sampling ranged from 1 liter bottles to 40 ml bottles. Table 5-3 in the DCQAP (Montgomery Watson, 1993a), provides detailed information on sample containers, preservatives, and holding times for soil samples, and Table 5-4 in the DCQAP describes these parameters for water samples. Each sample container had pre-printed, bar-coded labels supplied by ESE and DataChem, which assigned a unique designation to each sample.

A.7.2.2. Following sample collection and labeling, the sample container(s) was placed in a cooler containing ice to cool the sample to the required 4°C. Though this is not a handling requirement for metals, cyanide or anions, it is required for most of the other analyses for the investigation.

A.7.2.3. After the completion of the daily sampling tasks, the sample cooler containing the samples was transported to the on-site office trailer and prepared for shipment to the analytical laboratory. All glass sample containers were wrapped with one or two layers of plastic bubble wrap, fresh ice was added to the cooler(s), and the samples were packed as securely as possible within the cooler(s).

A.7.2.4. In conjunction with the packing procedure, the following handling and shipping documentation was prepared:

- A chain of custody (COC) was completed, showing all sample ID numbers, number of containers, date and time taken, analyses requested, and other pertinent information. These COC forms were provided for the investigation by the appropriate laboratory, pre-printed with the sample ID designations, including equipment blank and trip blank documentation. An original signed copy of the COC was placed inside a plastic envelope and taped to the inside of the cooler top. A copy was retained for Montgomery Watson project records. The COC form was meant to meet applicable sample custody requirements and documentation necessary to maintain legal defensibility of the analytical data from those samples.

- A separate form recorded each cooler's contents, as well as equipment blank and trip blank information. This documentation was maintained to provide a record of what samples were contained in each cooler in the event the cooler was lost in shipment. As with the COC forms, the original form was sent with the cooler and a copy was kept for project records.

A.7.2.5. After the samples and paperwork were secured in their respective coolers, the coolers were closed, fastened with fiberglass strapping tape, secured with dated and initialed custody seals, and labeled with the appropriate shipping and return labels.

A.7.2.6. Sample coolers were shipped via Federal Express overnight delivery to the ESE Laboratory in Gainesville, Florida and by Montgomery Watson staff to DataChem Laboratories in Salt Lake City, Utah. Those samples collected on Saturday and Sunday were placed in a full-size refrigerator at the office trailer for storage until the Monday shipment. Both the office trailer and the refrigerator were secured when no Montgomery Watson project personnel were present at the trailer.

APPENDIX B

SOIL SAMPLING METHODS AND SOIL BORING, TEST PIT, AND SURFACE SOIL SAMPLING LOGS

B.1 INTRODUCTION

B.1.0.1. This appendix summarizes the soil sampling methods used at TEAD-N during the Phase II RFI. Included are descriptions of the drilling methodology, excavation test pit procedures, and the surface soil sampling techniques used to collect soil samples. Also included are the soil boring logs and surface soil sampling logs completed during these sampling activities.

B.2 DESCRIPTION OF DRILLING AND TEST PIT METHODS

B.2.1. Hollow-Stem Auger Drilling Methodology

B.2.1.1. Soil borings up to 20-feet deep were advanced with a CME 750 all-terrain drill rig equipped with 8-inch outside diameter hollow stem augers. Overland Drilling and EarthTec Drilling Company provided these drilling services. Once the auger was advanced to the top of the sampling interval, an undisturbed sample was collected by driving a 1-foot long, 2.5-inch inside diameter split spoon sampler ahead of the auger using a 140-pound "hammer". Upon retrieval, the split spoon was opened and the sample was screened with a PID, logged according to the USCS soil classification system, and placed into a decontaminated stainless steel bowl for compositing. Following homogenization, the soil was placed into the analyte-specific sample container(s) using a stainless steel trowel or spoon.

B.2.2. Percussion Hammer Drilling Methodology

B.2.2.1. Because difficult drilling conditions (i.e., a thick vadose zone consisting of sand, gravel, cobbles, and boulders) were anticipated, the monitoring well borings and four 100-foot borings at SWMU 42 were drilled using dual-wall reverse-circulation drilling techniques. Layne Environmental Services, Inc. provided these drilling services. The dual-wall reverse-circulation drilling method uses heavy walled 10-inch outside diameter drilling pipe advanced with an above-ground hammer. Air used as a circulating fluid is injected through the top drive and forced down the outer annulus of the dual-wall pipe to

the drill bit, where it is directed to the center of the pipe. The air returns with cuttings via the inner drill pipe. After the cuttings reach the surface through the inner pipe, they are discharged through a material-handling hose into a cyclone separator. In the cyclone, the air escapes through the top and drill cuttings drop through the bottom.

B.2.2.2. Soil samples were collected every 5 feet for geologic classification using decontaminated, 2-foot long, 2.5-inch ID split-spoon samplers. Samplers were attached to the drill rod, lowered down the center of the dual-wall drill casing, and advanced into undisturbed soils ahead of the drill bit using an automatic hammer. Blow counts were noted every 6-inches. Upon retrieval, each split spoon was opened, screened with a PID, and described according to the USCS soil classification system. At depths beyond approximately 150 feet, soils were logged from cyclone cuttings, as the soil at these depths was too hard to drive the split-spoon sampler.

B.2.3. Excavation Test Pit Methodology

B.2.3.1. The following procedure was used to log and sample test pits at SWMU 42.

- An area approximately 50 feet in radius around the previously staked trench location was marked off by six 36-inch orange traffic cones, with two additional cones placed to mark the backhoe entrance/exit from the area.

- UXB personnel conducted a visual surface sweep for UXO, using a method of walking parallel lanes across the marked area. Where possible, the visual sweep was combined with geophysical methods.

- After moving the backhoe to the trench location, test pit excavation began. Soil was removed in 6-inch to 12-inch lifts under the observation of a UXB employee, and staged on plastic sheeting. Montgomery field team personnel remained outside the 50-foot exclusion zone while excavation activities were in progress.

- When a sampling interval was reached, or at the completion of the test pit, the backhoe bucket was placed to one side, the backhoe shut down, and the Montgomery sampling personnel were signaled. Only at this time would the sampling team approach the test pit excavation across the previously cleared

exclusion zone. An organic vapor detector (OVA or OVM) was used by the sampling personnel to test all collected soil samples for organic vapors.

- Following sampling and logging tasks at the test pit, the pit was backfilled, again under the visual inspection of a UXB observer. No potentially explosive items were placed back into a test pit.

- In addition to the required Level D PPE, an approved hardhat was required for both Montgomery and UXB personnel when working with the backhoe.

B.3 DESCRIPTION OF SURFACE SOIL SAMPLING METHODS

B.3.0.1. Surface soil samples were collected from the top two inches of soil using a decontaminated stainless steel spoon and bowl. Surface samples were collected as composites from five aliquots evenly distributed on a 5-foot radius from the central sampling location with the exception of August 1995 sampling which were grab samples each collected from one location. The composite technique distributes each sample over a larger sampling area, providing an average measure of soil conditions. Samples were composited in the stainless steel bowl before being logged according to the USCS and placed into the analyte-specific sample containers.

B.3.0.2. Because of the reactivity of chromium in the hexavalent state, soil samples collected for total chromium and hexavalent chromium analyses from SWMUs 1, 20, 21, and 42 were not homogenized prior to containerization. These samples were collected as grab samples with a stainless steel trowel, and placed directly into the sample container.

B.4 SOIL BORING AND SURFACE SOIL SAMPLING LOGS

B.4.0.1. The soil boring and surface soil sampling logs in this appendix are arranged as follows:

1. Surface Soil Sampling Logs for the Main Demolition Area (SWMU 1)

2. Soil Boring and Surface Soil Sampling Logs for the AED Deactivation Furnace Site (SWMU 20)

3. Surface Soil Sampling Logs for the Deactivation Furnace Building (SWMU 21)

4. Soil Boring Logs for the Pesticide Handling and Storage Area (SWMU 34)

5. Soil Boring and Surface Soil Sampling Logs for the Contaminated Waste Processing Plant (SWMU 37)

6. Soil Boring, Surface Soil, Sampling, and Test Pit Logs for the Bomb Washout Building (SWMU 42)

7. Soil Boring Logs for the monitoring wells at the Stormwater Discharge Area (SWMU 45)

8. Soil Boring Logs for the borings along the stormwater lines in the 500-Series Buildings area

9. Soil Boring Logs for the Old Dispensary Discharge–Building 400 (SWMU 48).

B.4.0.2. All soil boring, surface soil sampling, and test pit logs from the Phase II RFI were completed by Montgomery Watson personnel in the field. No office transcription or drafting has been done on the logs.

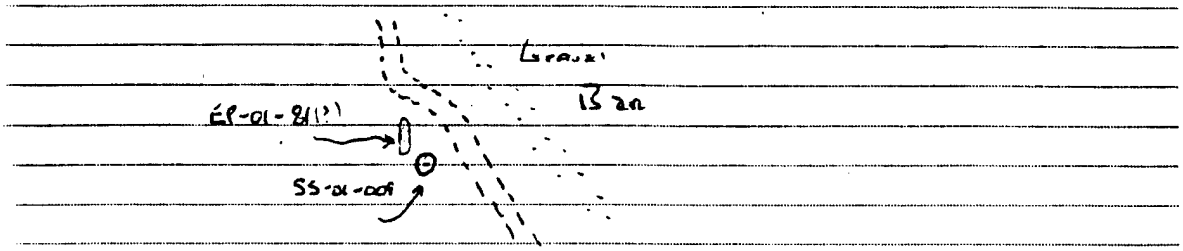
MAIN DEMOLITION AREA
(SWMU 1)

SURFACE SOIL SAMPLING LOGS

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-01-009
DATE SAMPLED: 9 June 1994
TIME: 1300
WEATHER CONDITIONS: No. Breeze, Clear. 80° F.
LOCATION OF SAMPLING REFERENCE POINT:

Meters N.S
Meters E.W
of Survey Ref.



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color. % gv, % sa. % fi. moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0.2'-0.5'	SM	Dark Brown (7.5YR 3/2) dry silty Sand. About 50% well-Graded v.f.to to coarse, sub-rounded to sub-Angular Sand. Loose. About 30%-40% fines, low Plasticity to med. Plasticity. About 5% f.-c Gravel. Strong HCl reaction.	N/A	(Grab) Composite Other

Comment: Collected Near (Possible) EP-01-081 location (1992).

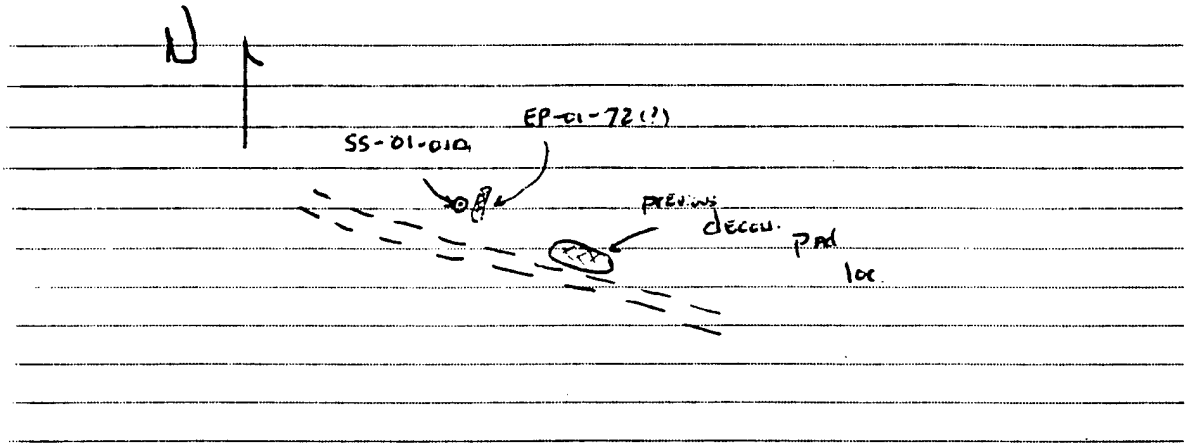
PROJECT NO. 2.0170

MONTGOMERY WATSON

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-01-010
DATE SAMPLED: 9 June 1994
TIME: 1340
WEATHER CONDITIONS: Clear, north breeze. 80° F.
LOCATION OF SAMPLING REFERENCE POINT:

Meters N,S
Meters E,W
of Survey Ref.



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0.1'-0.5'	ML	Very dark Grayish Brown (10YR 3/2) dry sandy silt. About 60%-65% fines, low Plasticity, Loose to mod. cohesive. About 35%-40% v. fine to fine well-Graded SAND, sub-rounded. No Gravel. Strong HCl reaction.	N/A	(Grab) Composite Other

Comment:
Collected 10'-15' west of EP-01-72 location.

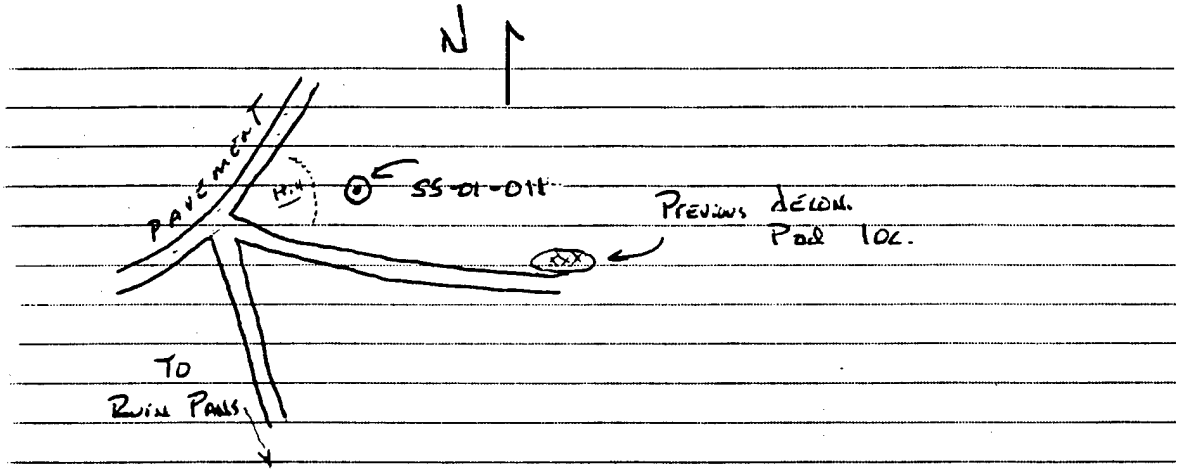
PROJECT NO. 2942.0170

MONTGOMERY WATSON

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-01-011
DATE SAMPLED: 9 June 1994
TIME: 1400
WEATHER CONDITIONS: CLEAR, North breeze, 80° F.
LOCATION OF SAMPLING REFERENCE POINT:

Meters N,S
Meters E,W
of Survey Ref.



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0.2'-0.5'	ML	Dark Grayish brown (2.5Y 4/2) dry silt w/s and. About 75% fines, loose. Low Plasticity. About 25% v. fine to medium well-graded sand. No Gravel.	N/A	(Grab) Composite Other

Comment: Collected in General vicinity of EB-01-075.

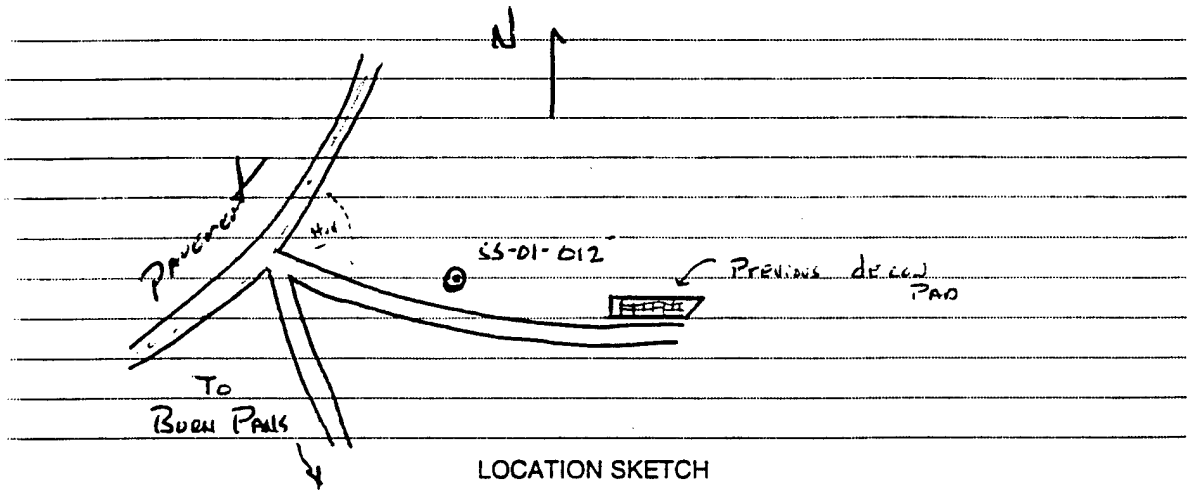
PROJECT NO. 2.0170

MONTGOMERY WATSON

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-01-012
DATE SAMPLED: 9 June 1994
TIME: 1420
WEATHER CONDITIONS: CLEAR, North Breeze, 80°F
LOCATION OF SAMPLING REFERENCE POINT:

Meters N.S
Meters E.W
of Survey Ref.



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0.2'-0.5'	ML/CL	Dark Grayish brown [2.5Y 4/2] dry Silt w/ Sand. About 75%-80% fines w/ low to med. Plasticity; ~~loose~~ mod. dense. About 20%-25% v.f. to fine Sand. No Gravel.	N/A	(Grab) Composite Other

Comment:
Collected in vicinity of Previous EP-01-094 loc.

PROJECT NO. 2942.0170

MONTGOMERY WATSON

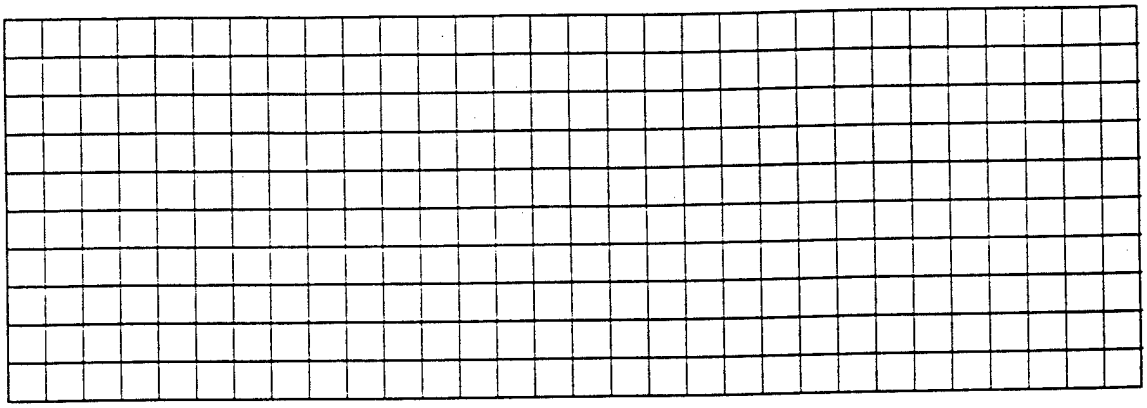
AED DEACTIVATION FURNACE SITE
(SWMU 20)

SURFACE SOIL SAMPLING LOGS

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-20-017
DATE SAMPLED: 8-6-95
TIME: 1230
WEATHER CONDITIONS: Clear + Sunny
LOCATION OF SAMPLING REFERENCE POINT: SS-20-017

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0-3"	ML	Light brown clayey Silt	0	(Grab) Composite Other

Comment: Native soils - no gravel

PROJECT NO. 2942 0160 7/13/95

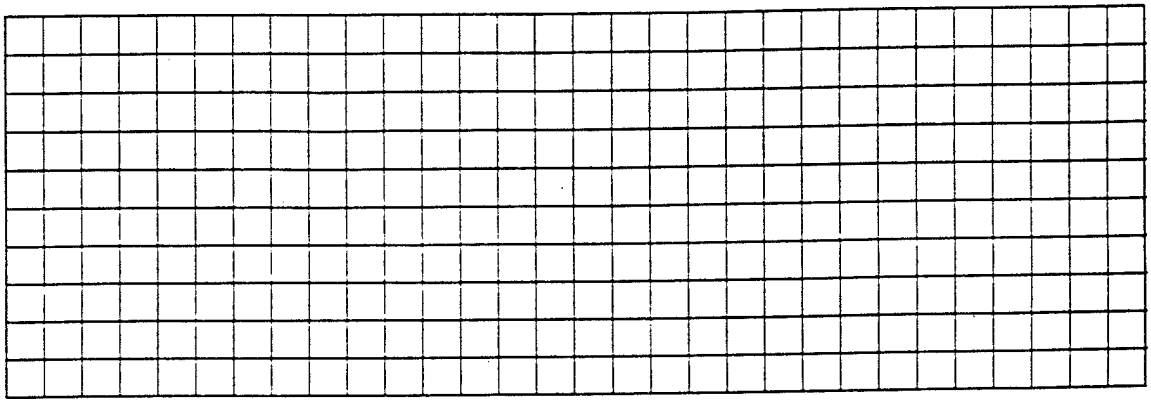
MONTGOMERY WATSON

ATTACHMENT 1

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-20-018
DATE SAMPLED: 8-8-95
TIME: 1140
WEATHER CONDITIONS: Clear & Sunny
LOCATION OF SAMPLING REFERENCE POINT: SS-20-018

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0-4"	GM	Light Brown silty Gravel with Some clay and Sand, dry	0	(Grab) Composite Other

Comment:

PROJECT NO. 2942 0160 7/13/95

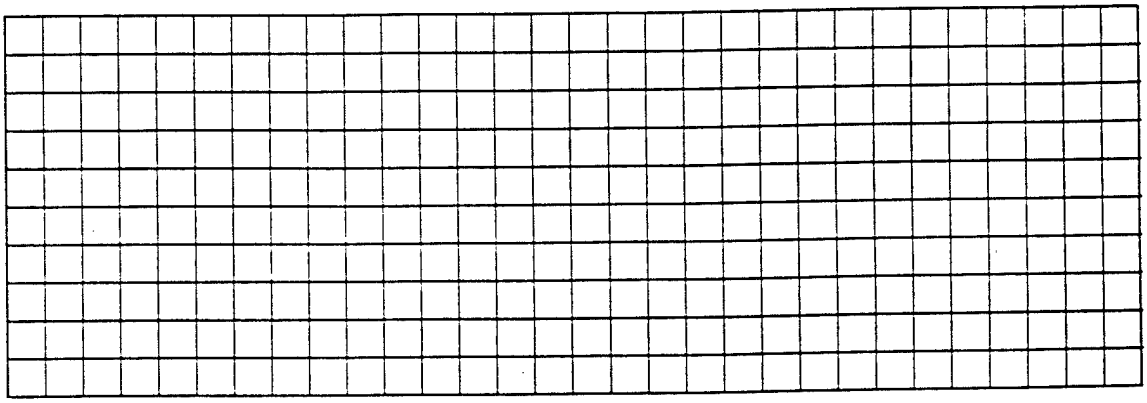
MONTGOMERY WATSON

ATTACHMENT 1

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-20 - 019
DATE SAMPLED: 8-8-95
TIME: 1150
WEATHER CONDITIONS: Clear & Sunny
LOCATION OF SAMPLING REFERENCE POINT: SS-20-019

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0-6"	GM	Reddish brown silty gravel with some sand (moist)		(Grab) Composite Other

Comment: Beneath asphalt - moist soils

PROJECT NO. 2942.0160 7/13/95

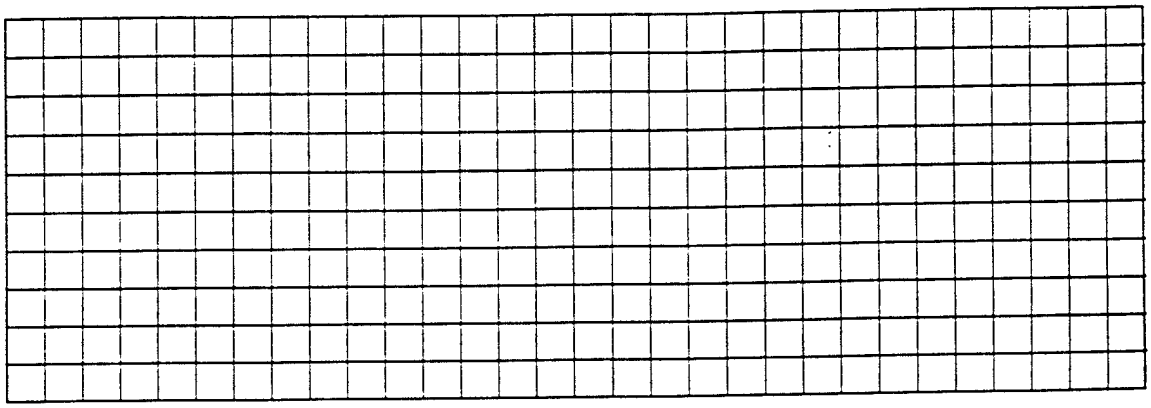
MONTGOMERY WATSON

ATTACHMENT 1

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-20-020
DATE SAMPLED: 8-8-95
TIME: ~~1120~~ 1120
WEATHER CONDITIONS: Clear + Sunny
LOCATION OF SAMPLING REFERENCE POINT: SS-20-020

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0-4"	ML/GM	Light Brown silty grand/gravely silt with some clay, dry	0	(Grab) Composite Other

Comment:

Blind duplicate SS-20-025

PROJECT NO. 2942.0160 7/13/95

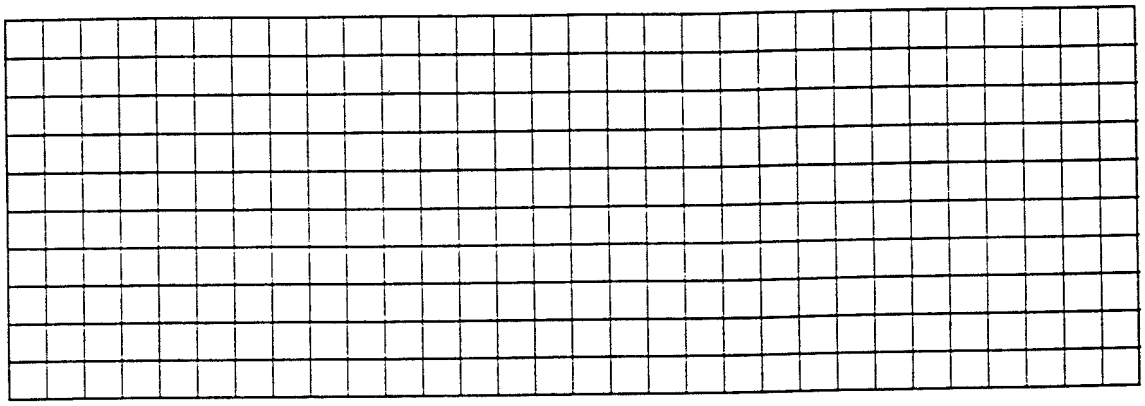
MONTGOMERY WATSON

ATTACHMENT 1

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-20-021
DATE SAMPLED: 8-8-95
TIME: 1220
WEATHER CONDITIONS: Clear + Sunny
LOCATION OF SAMPLING REFERENCE POINT: SS-20-021

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0-4"	ML	Light brown clayey silt w/ some gravel, dry	0	(Grab) Composite Other

Comment:

PROJECT NO. 2942.0160 7/13/95

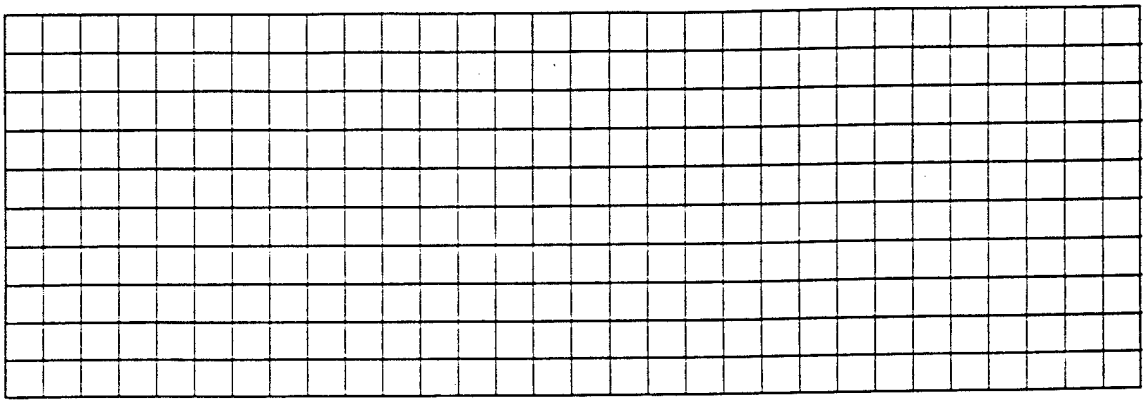
MONTGOMERY WATSON

ATTACHMENT 1

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-20-022
DATE SAMPLED: 8-8-95
TIME: 1200
WEATHER CONDITIONS: Clear & Sunny
LOCATION OF SAMPLING REFERENCE POINT: SS-020-022

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0-6"	ML	Light brown gravelly silt earth some clay, dry	0	(Grab) Composite Other

Comment:
MS, MSD, Samples from here

PROJECT NO 2942.0160 7/13/95

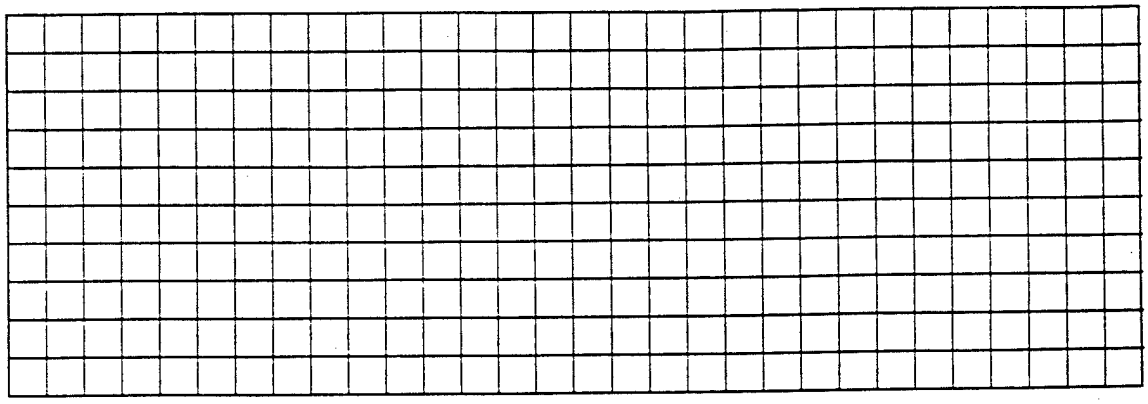
MONTGOMERY WATSON

ATTACHMENT 1

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-20-023
DATE SAMPLED: 5-8-95
TIME: 1110
WEATHER CONDITIONS: Clear & Sunny
LOCATION OF SAMPLING REFERENCE POINT: SS-20-023

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0-4"	ML	Light Brown ~~silty~~ clayey silt w. fine sand; dry	0	(Grab) Composite Other

Comment:

PROJECT NO. 2942 0160 7/13/95

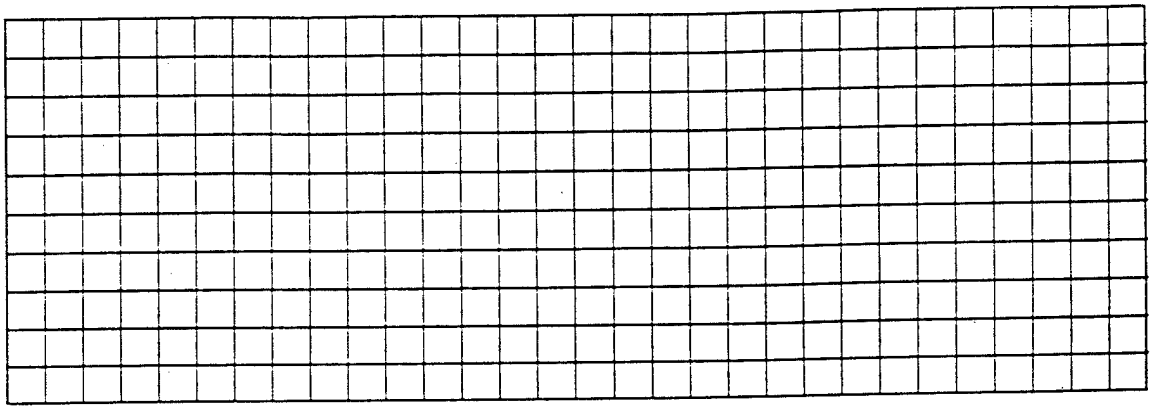
MONTGOMERY WATSON

ATTACHMENT 1

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-20-024
DATE SAMPLED: 8-8-95
TIME: 1240
WEATHER CONDITIONS: Clear & Sunny
LOCATION OF SAMPLING REFERENCE POINT: _____

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0-5"	ML	Light brown clayey silt dry	0	(Grab) Composite Other

Comment: natural soils

PROJECT NO. 2942.0160 7/13/95

MONTGOMERY WATSON

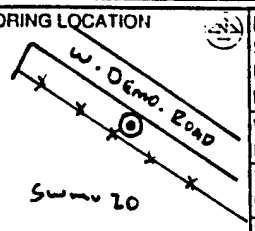
ATTACHMENT 1

AED DEACTIVATION FURNACE SITE
(SWMU 20)

SOIL BORING LOGS

11-4-93
SB-20-001

BORING LOCATION



Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-4-93 Date Completed: "
Logged By: MTA/DCK
Water Elevation (ft.): N/A
Date Measured:
Total Depth (ft.): 3.0'
Diameter (in.):

~~Monitoring Well No.:~~ SB-20-001
Northing: 135' Easting: 145° from 20-1
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor:
Drilling Method:

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	5	65	30	0	Poured Line directly above - Done By Hand - Unsaturated above			SM	Gravelly, silty, clayey, sand; Dark brown (10YR3/3) 15% clay, 15% silt; Very fine to medium sand, subangular; some gravel to 30mm in dia., subrounded; loose; dry.	
1	10	65	25	0				SM	Gravelly, clayey, sand; dark yellowish brown (10YR4/4); Very fine to coarse sand, subangular to subrounded; some gravel to 50mm in dia, subrounded; loose; dry	
2				0				SM	AS ABOVE	
3										
4										

2+2 Dup #1 A 0941 #1
B 2 0952 #2
C 2 1004 #3
EQ BLK TNEQB-2 1017

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

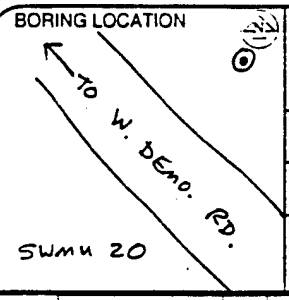
MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

BORING LOCATION



Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-2-93 Date Completed: 11-2-93
Logged By: MJA/BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

~~Monitoring Well No.:~~ SB-20-002
Northing: 160' Easting: 119° from 20
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HOLLOW STEM AUGER (HSA)

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

11-2-93
SB-20-002

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color: size and angularity of each component or plasticity; density; moisture content: additional facts)
0		10	30	0	5	SS	80%	SM	Silty sand; brown (10YR 5/3); very fine to fine sand; rounded; loose; dry.
					12				
1	20	60	20	0	16		100%	SM	Silty, gravelly, sand; pale brown (10YR 6/3); very fine to fine sand; gravel to 25mm in dia.; subrounded; loose; dry.
					24				
2				0	46		90%	SM	AS ABOVE.
					91				
3									
4									

ELEVATION (FEET)

A 1553 #4
B 1556 #5
C 1559 #6

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

11-2-93
SB-20-003

BORING LOCATION

Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-2-93 Date Completed: 11-2-93
Logged By: MJA / BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

Monitoring Well No.: SB-20-003
Northing: 210' Easting: 100' from 20-1
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

To be demo. FP.
SWMU 20

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	15	60	25	0	4	SS	75%	SM	Gravelly, silty sand; very dark grayish brown (10YR 3/2); very fine to fine sand, subangular to subrounded; gravel to 40 mm in dia, subrounded; loose; dry.	
					12					
1	50	40	10	0	64		60%	GM	Silty, sandy, gravel; Grayish brown (10YR 5/2); very fine to very coarse sand, subangular to subrounded, gravel to 40mm in dia., angular to subrounded; loose; dry.	
					60					
2				0	69		25%	GM	AS ABOVE.	
					89					
3										
4										

A 1511 #7
B 1630
C 1537 #9

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

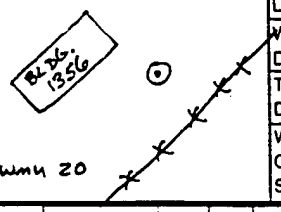
MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

BORING LOCATION



Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-3-93 Date Completed: 11-3-93
Logged By: MJA / BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

~~Monitoring Well No.~~: SB-20-004
Northing: 135' Easting: 43° from 20-2
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

11-3 13
SB-20-004

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)
0	15	70	15	0	9	SS	60%	SM	Gravelly, silty sand; dark grayish brown (10YR 4/2); very fine to fine sand, gravel to 20 mm in dia, subangular to subrounded; loose; dry.
					13				
1	50	40	10	0	23		40%	GM	Silty, sandy, gravel; very dark grayish brown (10YR 3/2); very fine to coarse sand, gravel to 50 mm in dia.) angular to rounded; loose; dry.
					36				
2				0	31		30%	GM	AS ABOVE.
					31				
3									
4									

A 2
#10
1457

B 1
#11
502

C 1
#12
1508

ELEVATION (FEET)

PROJECT NO. 2942.0170

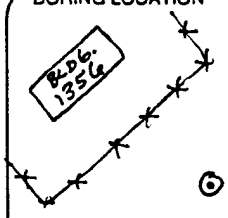
*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

11-2-93
SB-20-005

BORING LOCATION



Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-2-93 Date Completed: 11-2-93
Logged By: MJA / BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

~~Monitoring Well No.:~~ SB-20-005
Northing: 130' Easting: 75° from 20-2
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	10	75	15	0	4	SS	100%	SM	Gravelly, silty, sand; brown (10YR 4/3); very fine to fine sand, gravel to 20 mm in dia., subrounded; loose; dry.	
					24					
1	60	30	10	0	30		40%	GM GW	Silty, sandy, gravel; light grayish brown (10YR 6/2); very fine to fine sand, gravel from 5 to 60 mm in dia.) angular to subrounded; loose; dry.	
					55					
2				0	51		25%	GM	AS ABOVE.	
					33					
3										
4										

A 1419 #13
B 14 1428
C #15 1430

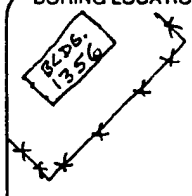
PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

BORING LOCATION



Swmu 20

Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-2-93 Date Completed: 11-2-93
Logged By: MJA/BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

Monitoring Well No.: SB-20-006
Northing: 155' Easting: 101' from 20-2
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

11-2-93
SB-20-006
A

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	5	70	25	0	8	SS	100	SM	Silty sand; brown (10YR 5/3); very fine to fine sand; trace gravel to 15 mm in dia.; subrounded; loose; dry.	
					13					
1	40	35	25	0	42		20%	GM	Silty, sandy, gravel; pale brown (10YR 6/3); very fine to fine sand; gravel to 60 mm in dia; angular to subrounded; loose; dry.	
					35					
2				0	40		25%			
					54					
3										
4										

A 1337 #16
B 1342 #17
C 1356 #18

PROJECT NO. 2942.0170

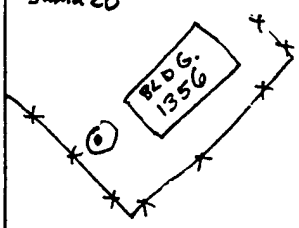
*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

BORING LOCATION

Swmu 20



Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-3-93 Date Completed: 11-3-93
Logged By: MJA / BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

~~Monitoring Well~~ No.: SB-20-007
Northing: 85' Easting: 9' from 20-2
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

11-3-93
SB-20-007

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	40	50	10	0	3	SS	90%	SM	Silty, gravelly, sand; very dark grayish brown (10YR 3/2); fine to coarse sand, subangular to rounded; gravel from 5 to 50mm in dia.; subrounded; loose; dry.	
					11					
1	50	30	20	0	23		60%	GM	Silty, sandy, gravel; brown (10YR 5/3); fine to coarse sand, angular to subrounded; gravel to 40mm in dia., subrounded to rounded; loose; dry.	
					80					
2				0	116		5%	GM	AS ABOVE.	
					125					
3										
4										

A 2 #19 1419

B 2 #20 1425

C 1 #21 1433

PROJECT NO. 2942.0170

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

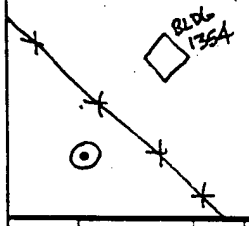
MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

BORING LOCATION

SWMU 20



Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-4-93 Date Completed: 11-4-93
Logged By: MJA / BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

Monitoring Well No.: SB-20-008
Northing: 135' Easting: 325' from 20-2
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

11-4-93
SB-20-008

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	45	40	15	0	7	SS	80%	GM	Silty, sandy, gravel; brown (10YR 5/3); very fine to fine sand, gravel to 20 mm in dia., rounded; loose; dry	
					6					
1				0	16		50%	GM	AS ABOVE.	
					58					
2	70	15	15	0	116		10%	GM	Silty, sandy, gravel; pale brown (10YR 6/3); very fine to fine sand, gravel to 40 mm in dia.; subangular to rounded; loose; dry.	
					200					
3										
4										

2
A
#22
1203

1
B
#23
1209

1
C
#24
1221

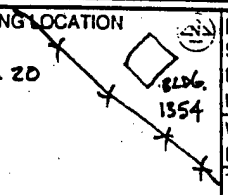
PROJECT NO. 2942.0170

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

BORING LOCATION



Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-4-93 Date Completed: 11-4-93
Logged By: MJA/BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

~~Monitoring Well~~ No.: SB-20-009
Northing: 155' Easting: 300° from 20
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

11-4-93
SB-20-009

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	60	25	15	0	30	SS	50%	GM	Silty, sandy, gravel; grayish brown (10YR 5/2); fine to medium sand, subrounded; gravel to 50 mm in dia., subrounded; loose; dry.	
					49					
1				0	14		45	GM	AS ABOVE.	
					25					
2				0	48		40	GM	AS ABOVE.	
					60					
3										
4										

2
A
#25
1129

1
B
#26
1136

1
C
#27
1141

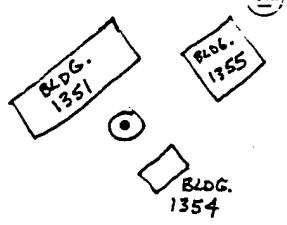
PROJECT NO. 2942.0170

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

BORING LOCATION



SWMU 20

Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-4-93 Date Completed: 11-4-93
Logged By: MJA / BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

~~Monitoring Well~~ No.: SB-20-010
Northing: 150' Easting: 180° from 20-1
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

11-4-93
SB-20-010

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0										
1	50	30	20	0	11	SS	90	GC	Clayey, sandy, gravel; brown (10YR 5/3); fine to coarse sand, subangular to subrounded; gravel to 50 mm in dia., subrounded; loose; moist.	
					23					
1				0	14		80	GC	AS ABOVE.	
					78					
2	55	30	15	0	53		60	GM	Silty, sandy, gravel; dark grayish brown (10YR 4/2); fine to coarse sand, subrounded; gravel from 5 to 55 mm in dia.; angular to subrounded; loose; dry.	
					61					
3										
4										

A 0825 #28
B 1828 #29
C 0834 #30 dup

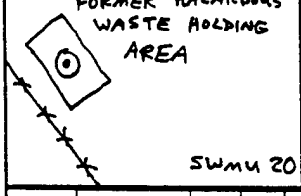
PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

BORING LOCATION



Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-3-93 Date Completed: 11-3-93
Logged By: MJA/BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

Monitoring Well No.: SB-20-011
Northing: 215' Easting: 344° from 20-2
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

11-3-93
SB-20-011

A
#31
1348

B
#32
1400

C
#33

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	50	40	10	0	6	SS	70	GM	Silty, sandy, gravel; brown (10YR 5/3); fine to medium sand, subrounded; gravel to 30 mm in dia., rounded; loose; dry.	
					14					
1				0	19		60	GM	AS ABOVE.	
					32					
2				0	50		50	GM	AS ABOVE.	
					70					
3										
4										

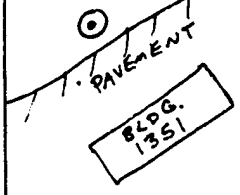
PROJECT NO. 2942.0170

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

BORING LOCATION



SWMU 20

Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-3-93 Date Completed: 11-3-93
Logged By: MJA / BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

~~Monitoring Well~~ No.: SB - 20-012
Northing: 135' Easting: 221° from 20-1
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

11-3-93
SB-20-012

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)
0									
	50	30	20	0	7	SS	70%	GC	Clayey, sandy, gravel; dark grayish brown (10YR 4/2); fine to coarse sand; subrounded; gravel to 30mm in dia., subrounded; loose; moist.
A #34 1322					13				
1									
	55	30	15	0	56		50%	GM	Silty, sandy, clay; brown (10YR 4/3); fine to coarse sand, subangular to subrounded; gravel to 40mm, angular to subrounded; loose; moist.
B -35 1325					29				
2									
				0	19		60	GM	AS ABOVE.
C #36					21				
3									
4									

ELEVATION (FEET)

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

BORING LOCATION



SWMU 20

Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-3-93 Date Completed: 11-3-93
Logged By: MJA / BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"
Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

Monitoring Well No.: SB-20-013
Northing: 135' Easting: 250° from 20-1
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

11-3-93
SB-20-013

A
#37
1251

B
#38
1257

C
#39
1301

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	5	70	25	0	5	SS	100	SM	Gravelly, silty, sand; dark grayish brown (10YR 4/2); very fine to fine sand, subrounded; trace gravel to 20 mm in dia.; subrounded; loose; dry	
					19					
1	50	40	10	0	49		25	GM	Silty, sandy, gravel; brown (10YR 5/3); Very fine to fine sand; gravel from 5 to 45 mm in dia., angular to subrounded; loose; dry.	
					41					
2				0	50		25	GM	AS ABOVE.	
					46					
3										
4										

PROJECT NO. 2942.0170

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

BORING LOCATION

Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-3-93 Date Completed: 11-3-93
Logged By: MJA / BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

~~Monitoring Well~~ No.: SB-20-014
Northing: 170' Easting: 276' from 20-1
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

BLDG. 1351

SWMU 20

11-3-93
SB-20-014

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)
0	20	60	20	0	6	SS	70	SM	Gravelly, silty, sand; brown (10YR 4/3); fine to med. sand, subrounded; gravel to 35 mm in dia., subrounded; loose dry;
					25				
1	60	30	10	0	33		50	GM	Silty, sandy, gravel; light brownish gray (10YR 6/4); very fine to fine sand; gravel to 50 mm in dia.) subrounded; loose) dry
					34				
2				0	33		50	GM	AS ABOVE.
					39				
3									
4									

A 1209 #40
B 1220 #
C 1227 #42

ELEVATION (FEET)

PROJECT NO. 2942.0170

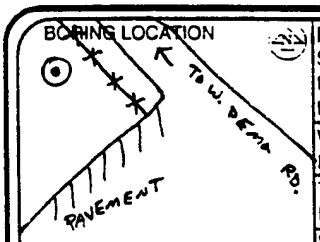
*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

11-3-93
SB-20-015

BORING LOCATION



SWMU 20

Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-3-93 Date Completed: 11-3-93
Logged By: MJA/BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

~~Monitoring Well~~ No.: SB-20-015
Northing: 40' Easting: 280° from 20-1
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	5	80	15	0	9	SS	90	SM	gravelly Silty, sand; very dark grayish brown (10 YR 3/2); fine to medium sand, subangular; trace gravel to 15mm in dia., subrounded; loose; dry	
					9					
1				0	16	SS	80	SM	AS ABOVE EXCEPT Brown (10 YR 5/3).	
					78					
2	60	30	10	0	86		25	GM	Silty, sandy, gravel; light yellowish brown (10 YR 6/4); very fine to fine sand; gravel to 60 mm in dia., angular to subrounded; loose; dry.	
					45					
3										
4										

A 1130 #43

B 1134 '4

C #45 1145

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

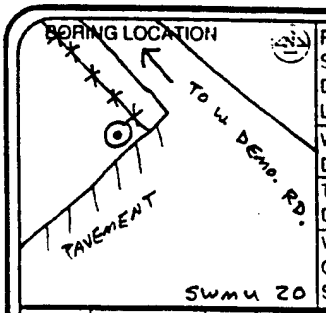
TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

11-4-93
SB-20-016

BORING LOCATION



Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-4-93 Date Completed: 11-4-93
Logged By: MJA / BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.):

~~Monitoring Well~~ No.: SB-20-016
Northing: 40' Easting: 155° from 20-1
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor:
Drilling Method:

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
0	5	75	20	0	2			SM	Gravelly, silty, sand; very dark grayish brown (10 YR 3/2); fine to medium sand, angular; trace gravel to 20mm in dia., subrounded; loose; dry
1	40	40	20		2			SM	AS ABOVE EXCEPT MORE GRAVEL.
2	40	50	10		2			SM	Gravelly, silty, sand; brown (10YR 4/3); fine to coarse sand, subrounded; gravel to 40mm in dia., subrounded; loose, dry.
3									
4									

ELEVATION (FEET)

A #46 1037
B #47 1053
C #48 1110

Located under Power Lines - By Hand with stainless steel shovel

PROJECT NO. 2942.0170

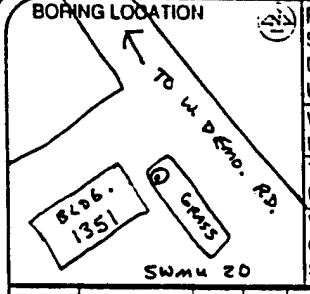
* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RI
SOIL BORING LOG

PAGE 1 OF 1

BORING LOCATION



Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-4-93 Date Completed: 11-4-93
Logged By: MJA / BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

~~Monitoring Well~~ No.: SB-20-017
Northing: 90' Easting: 162° from 20-1
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

11-4-93
SB-20-017

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	15	65	20	0	7	S	75	SM	Gravelly, silty, sand; very dark grayish brown (10YR 3/2); fine to medium sand, subrounded; gravel to 40mm in dia., subrounded; loose; dry.	
					8					
1				0	7		40%	SM	AS ABOVE.	
					40					
2	60	30	10	0	33		40	GM	Silty, sandy, gravel; brown (10YR 4/3); fine to coarse sand; subangular to subrounded; gravel to 35mm in dia., subrounded; loose; moist.	
					33					
3										
4										

A 2
0900
#49

B 2+1
0905
50
Lup #60

C 2
#51
0909

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

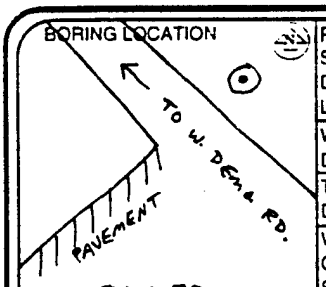
MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PROJECT NO. 2942.0170

11-3-93
SB-20-018

BORING LOCATION



Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-3-93 Date Completed: 11-3-93
Logged By: MJA/BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

~~Monitoring Well~~ No.: SB-20-018
Northing: 70' Easting: 99° from 20-1
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
0									
	5	70	25	0	9	SS	100	SM	Gravelly, silty, sand; pale brown (10 YR 6/3); very fine to fine sand) gravel to 30 mm in dia., subrounded; loose; dry.
					25				
1									
	15	60	25	0	75		80	SM	AS ABOVE EXCEPT MORE GRAVEL
					73				
2									
				0	45		65	SM	AS ABOVE.
					54				
3									
4									

A 0936 #52
B 0940 #53
C #54 0950

ELEVATION (FEET)

PROJECT NO. 2942.0170

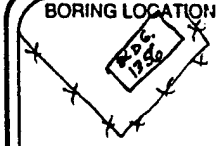
* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

11-2-93
SB-20-019
A
1300
#55

BORING LOCATION



Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-2-93 Date Completed: 11-2-93
Logged By: MJA/BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

Monitoring Well No.: SB-20-019
Northing: 2501 Easting: 105° from 20-2
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color: size and angularity of each component or plasticity; density; moisture content: additional facts)	ELEVATION (FEET)
0	TR	75	25	0	5	SS	70	SM	Gravelly, silty, sand; brown (10YR 5/3); very fine to fine sand; trace gravel to 5mm in dia., rounded; loose; dry	
					8					
1				0	10		70	SM	AS ABOVE.	
					25					
2				0	34		50	SM	AS ABOVE.	
					34					
3										
4										

B
1305
-4

C
1311
#57

PROJECT NO. 2942.0170

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

BORING LOCATION



Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-4-93 Date Completed: 11-4-93
Logged By: MJA / BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

~~Monitoring Well~~ No.: SB-BK-007
Northing: 800' Easting: 308' from 20-2
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

11-4-93
SB-BK-007

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0		75	25	0	2	SS	100	SM	Silty, Sand; brown (10YR 4/3); fine to medium grained; loose; dry.	
					2					
1				0	2					
					6					
2				0	13		80	SP	Sand; pale brown (10YR 6/3); fine grained; loose; dry; very well sorted.	
					15					
3										
4										

2
A
#58
1252

2
B
#59
1256

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

11-4-93
SB-BK-008

BORING LOCATION



Project: TEAD-N PHASE II
SWMU No. 20
Date Drilled: 11-4-93 Date Completed: 11-4-93
Logged By: MJA / BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"

~~Monitoring Well No.~~: SB-BK-008
Northing: 1200' Easting: 140' from 20-1
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	15	60	25	0	4	SS	100	SM	Gravelly, silty, sand; very fine to fine sand, subrounded; gravel to 25 mm in dia., subangular to subrounded; loose; dry.	
					30					
1					58					
	50	40	10	0	66		40	GM	silty, sandy, gravel; light brownish gray (10YR 6/2); very fine to coarse sand, subangular to subrounded; gravel to 40mm in dia., angular to subrounded;	
2					88				loose; dry.	
					100					
3										
4										

A 2 #60 1340

B 2 #61 1352

PROJECT NO. 2942.0170

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

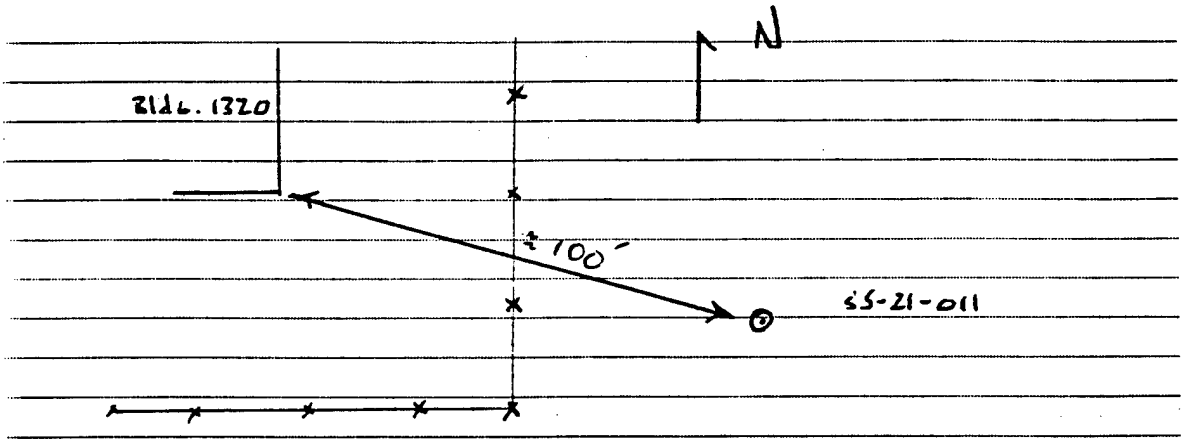
DEACTIVATION FURNACE BUILDING
(SWMU 21)

SURFACE SOIL SAMPLING LOGS

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-21-011
DATE SAMPLED: 9 June 1994
TIME: 0930
WEATHER CONDITIONS: Clear, 70°F, calm
LOCATION OF SAMPLING REFERENCE POINT:

Meters N,S
Meters E,W
of Survey Ref.



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0.2'-0.5'	GW-GM	Dark Grayish Brown (10YR 4/2), slits. Moist to dry well-Graded Gravel with Silt and Sand; About 60% fine to Coarse sub-rounded to rounded Gravel, Loose. About 30%-35% fine to medium well-Graded SAND; about 10% fines, NON-Plastic. STRONG HCl REACTION.	N/A	(Grab) Composite Other

Comment:

Collected from same general area as SS-21-005.

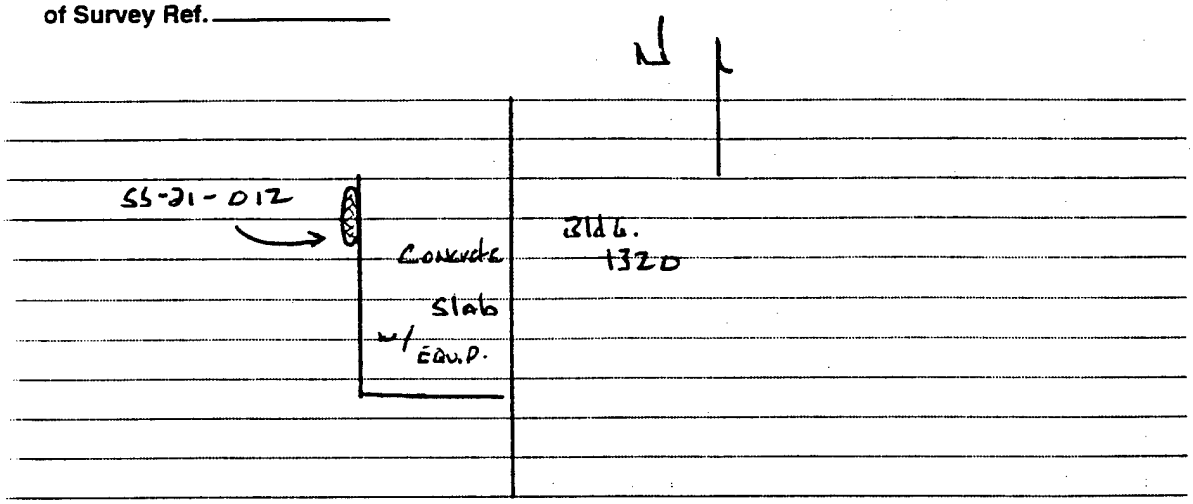
PROJECT NO. 12.0170

MONTGOMERY WATSON

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-21-012
DATE SAMPLED: 9 June 1994
TIME: 0950
WEATHER CONDITIONS: Clear, Calm, 70° F.
LOCATION OF SAMPLING REFERENCE POINT:

Meters N,S
Meters E,W
of Survey Ref.



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0.2'-0.5'	GW-GM	Black (10YR 2/1) slty. moist to dry well-Graded Gravel w/ silt & sand. About 70% fine to coarse sub-rounded to rounded Gravel, Loose. About 20% to 25% fine to coarse sand. 10% fines, Non-Plastic. Contains 2%-3% ferrous metal fragments.	N/A	(Grab) Composite Other

Comment: Collected from same vicinity as SS-21-008; submitted for total Cr and Cr^{+6} analysis. Collected along edge of Concrete slab.

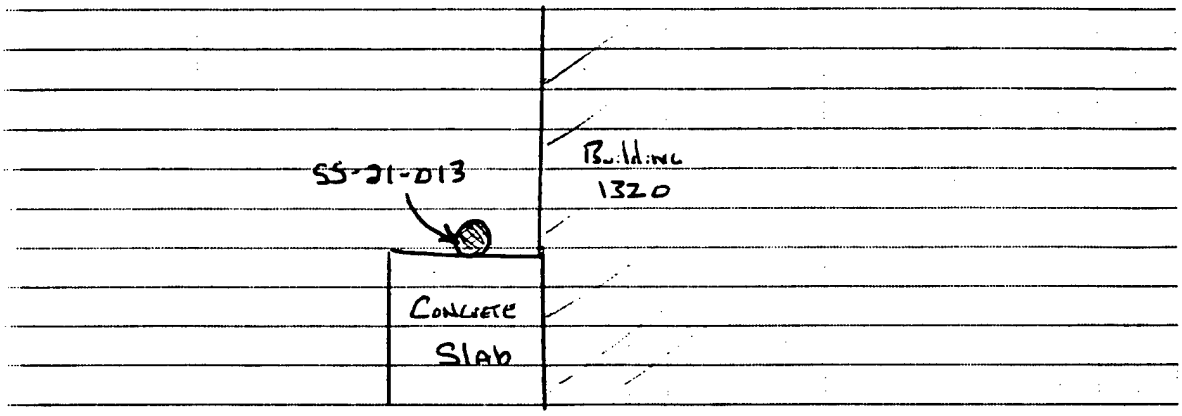
PROJECT NO. 2942.0170

MONTGOMERY WATSON

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-21-013
DATE SAMPLED: 9 JUNE 1994
TIME: 1020
WEATHER CONDITIONS: clear, Calm, 75° F.
LOCATION OF SAMPLING REFERENCE POINT:

Meters N,S
Meters E,W
of Survey Ref.



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0.2'-0.5'	GW-GM	Dark Grayish Brown (10YR 4/2) moist well-Graded Gravel w/ silt and Sand. About 70% fine to Coarse sub-rounded Gravel, Loose. About 20%-25% v. fine to coarse sand; 10% or Less fines, Non-Plastic. Strong HCl reaction. 1%-3% ferrous metal fragments in sample.	N/A	(Grab) Composite Other

Comment:

Collected from same area as SS-21-009 for total Cr + Cr^{+6} Analysis. Duplicate also submitted.

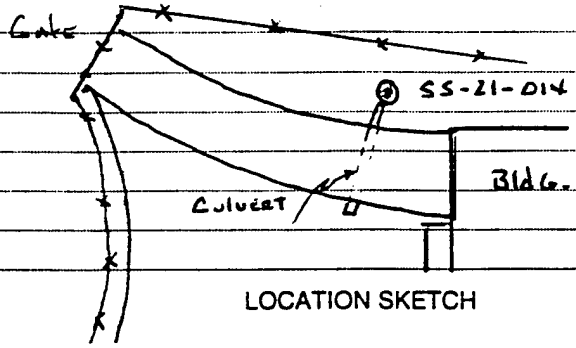
PROJECT NO. 2.0170

MONTGOMERY WATSON

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-21-014
DATE SAMPLED: 9 June 1994
TIME: 1045
WEATHER CONDITIONS: Clear, Calm, 75°F.
LOCATION OF SAMPLING REFERENCE POINT:

Meters N,S
Meters E,W
of Survey Ref.



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0.2'-0.5'	SM	Dark yellowish brown [10YR 3/4] moist silty sand w/ Gravel. About 60% v. fine to medium well-graded sand, sub-rounded, loose. About 25% fine sub-rounded Gravel; about 20%-25% fines w/ Low Plasticity. weak HCl reaction. Contains 2%-3% ferrous metal fragments.	N/A	(Grab) Composite Other

Comment:
Collected from depression at North end of Culvert.

PROJECT NO. 2942.0170

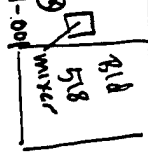
MONTGOMERY WATSON

PESTICIDE HANDLING AND STORAGE AREA
(SWMU 34)

SOIL BORING LOGS

SB-34-001

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 34
Date Drilled: 10-26 Date Completed: 10-26-93
Logged By: BKH

Water Elevation (ft.): NA
Date Measured:

Total Depth (ft.): 20'
Diameter (in.): 2.5"

~~Monitoring~~ SB Well No.:
Northing: Easting:

Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 329° TO 34-2 @ 36°

Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 - HSA

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	25	65	10	0.0	5	C		SM	SILTY SAND w/GRAVEL 10YR 3/2 V. dk grayish brown; NO PLASTICITY; LOOSE; SL. MOIST. SAND - FINE TO COARSE, SUB-ANGULAR GRAVEL FINE TO COARSE & COBBLES TO 6", SUB-ROUND.	
					9					
1					13					
					17					
2										
3									A LOT OF GRAVELS & COBBLES; SLOW DRILLING.	
4										

3.3-34-01A XRD 70 0945

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PROJECT NO. 2942.0170

Project: TEAD-N PHASE II RFI

JMM Boring No.: SB-34-C01

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5	35	60	5	0.0	2	C		SW	WELL GRADED SAND W/ GRAVEL; 10YR 4/2 - DK GRAYISH BROWN; NO PLASTICITY; V. DENSE; SL. MOIST; SAND - FINE TO COARSE, SUB-ANGULAR TO ANGULAR GRAVEL - FINE TO COARSE, ANGULAR - COBBLES >3"	
					65					
6										
7										
8	45	50	5	0.0	185			SW-GW	A.A. MORE GRAVEL + COBBLES	
					200					
9	45	50	5		100			SW-GW	A.A.	
					200					
10										
11										
12										
13									POORLY GRADED SAND W/ GRAVEL;	
14	55	40	5	0.0	34	C		SP	WELL GRADED SAND W/ GRAVEL, 10YR 5/3 - DK BR; NO PLASTICITY; DENSE; MOIST. SAND - FINE, SUB-ANGULAR. GRAVEL - WELL GRADED, ANGULAR TO SUB-ROUND COBBLES >3" PRESENT CONSISTING OF GRANITE & LIMESTONE.	
					36					
					36					

SB-34-01B @10.5'

SB-34-01C FROM 5'-10' @12.40

SB-34-01 13'-15'

PROJECT NO 25442.0101

Project: TEAD N PHASE II RFI

JMM Boring No.: SB-34-001

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
15										
16										
17										
18	10	30	10	0.0	37	C		GP-GM	POORLY GRADED GRAVEL W/ SILT AND SAND; 10YR 6/3 PALE BROWN; NO PLASTICITY; V. DENSE; SL. MOIST. SAND FINE, SUBANGULAR. ~~GRAVEL TO 5"~~ GRAVEL IS MOSTLY COBBLE SIZED. ~~COBBLES GRAVEL~~ COBBLES greater than 3", ANGULAR	
					100					
19					79					
					180					
20										
1										
2										
3										
4										

SB 34-01 E 1935-20' @ 1352

PROJECT NO.

Brad's Box

BORING LOCATION

Project: TEAD-N PHASE II RFI
SWMU No. 34
Date Drilled: 10-28-93 Date Completed: 10-28-93
Logged By: MJA / JKV
Water Elevation (ft.): _____
Date Measured: _____
Total Depth (ft.): ~~20~~ 15'
Diameter (in.): 2-5"

~~Monitoring Well No.~~: SB-34-002
Northing: 1,764,661 Easting: 793,003
Ground Surface Elevation (ft.): 4660'
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HOLLOW STEM AUGER (CME

Well Screen: Diameter _____ Depth _____ Slot Size _____
Casing: Diameter N/A Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

SB-34-002A
0842

SB-34-002B
0915

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
0					5				Dark grayish brown to lt. brownish grey (10YR 4/2 dry silty sand w/gravel (SM); about 65% sand, fine to coarse, sub-angular to rounded; loose. About 35% fine to coarse sub-rounded quartz gravels, w/occasional cobbles 10% or less fines, non-plastic.
1					10			SM	
					1				
2					25				
3									
4					12				
					100				

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE
SOIL BORI

PROJECT NO. 2942.0170

PAGE 1 OF 2

Project: _____

JMM Boring No.: _____

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5										
6										
7										
8										
9										
10									No recovery	
11									No recovery	
12										
13	25	65	10					SW-SM	MOIST MULT. - COLORED (mostly Lt Gray to greenish Gray) well-graded SAND w/ Silt & GRAVEL; About 60% - 70% f-c to COARSE sub-rounded to sub-angular SAND; Loose. About 25% f-c to COARSE sub-rounded GRAVEL, mostly Quartzite. About 10% fines, NON-plastic.	
14					20					
					36					
					30				Hole TD'ed @ 15.0' - refusal Center bit stuck - couldn't recover for sampling	

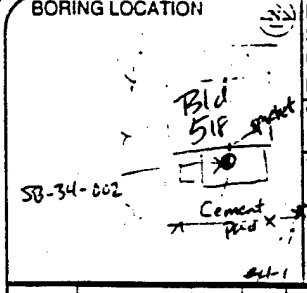
-5-34-022D

1535 -

PROJECT NO. _____

SB-34-003

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 34
Date Drilled: 10-27 Date Completed: 10-27-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 20'
Diameter (in.): 2.5"

Monitoring Well No.: SB
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 60' @ 140° TO 34-1
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 - HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	40	25	35	0.0	4	C		GM	SILTY GRAVEL W/ SAND; 10YR 3/3 - DK BROWN; NO ODOR; LOOSE; MOIST. SAND V. FINE TO FINE, SUB ROUND TO SUB-ANGULAR. GRAVEL - FINE, SUB ROUND TO ROUND.	
1					5					
					4					
					8					
2										
3										
	40	~~25~~ 0	20	2	34	C		GM	SILTY GRAVEL W/ SAND; 10YR 5/3 - BR; NO PLASTICITY; V. DENSE; MOIST. SAND FINE TO COARSE; SUB-ANGULAR. GRAVEL - ~~FINE~~ TO COARSE; SUB ANGULAR TO ANGULAR. COBBLES = 15% > 3", ANGULAR.	
4		+0			62					
					100					

0900 0.0-2.0'

0912 3.5-5.0'

PROJECT NO. 2942.0170

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

Project: TEAD N PHASE II RFE

JMM Boring No.: SB-34-003

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5										
6										
7									drilling through solid concrete	
8										
9										
0	45	40	15	0.0	19	C		GM	SILTY GRAVEL w/ SAND, 10YR 5/2 - grayish brown; NO PLASTICITY; V. DENSE; SL. MOIST; SAND V. FINE TO COARSE, SUB-ANGULAR.	
1					19				COBBLE GRAVEL TO COBBLES >3", Angular, quartzite and limestone.	
2										
3	35	45	10		34	C		SW-SM	well graded SAND w/ SILT AND GRAVEL; 10YR 5/2 grayish brown; NO PLASTICITY; DENSE to V. DENSE; DRY to SL. MOIST.	
4					43				SAND V. fine to coarse; sub ang to angular GRAVEL to COBBLES / Angular; quartz + limestone.	
					34					

SB-34-0030 12:09

SB-34-0030 14:15

PROJECT NO. _____

TEXACO PHASE II RFI

Project: 53-34-003
JMM Boring No.: 6

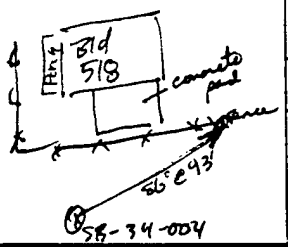
DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
15										
16										
17										
18	45	45	10	0.0	30	C		SW-SM	Well graded SAND w/ SILT AND GRAVEL, 10YR5/2 grayish brown; NO PLASTICITY; V. DENSE; DRY TO SL. MOIST; SAND V. FINE TO COARSE, SUB-ANG TO ANGULAR COARSE GRAVEL TO COBBLES, ANGULAR.	
19					41					
					57					
					44					
20									TD=20'	
1										
2										
3										
4										

GEOTECH B-34-0056 15:06

PROJECT NO. ____ ____

SB-34-004

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 34
Date Drilled: 10-24 Date Completed: 10-24-93
Logged By:
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 2.5"
Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

Monitonng Well No.: SOIL BORING SB-34-004
Northing: Easting:
Ground Surface Elevation (ft.):
Measunng Point is Ground Surface
Datum: NGVD (1929) 56' @ 93' TO 34-1
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 - HSA

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	60	20	20	0.0	9	C		GM	silty grand w/ sand; 10YR 3/3 - dk brown; NO PLASTICITY; LOOSE TO MED. DENSE; MOIST SAND - FINE TO COARSE, SUB ANGULAR. GRAVEL FINE TO COARSE, SUB ROUND TO SUB-ANGULAR ~~PROBABLY FILL LOOKS LIKE FILL~~	
					17					
1	20 ~~25~~	35 ~~9~~	45 ~~66~~	0.0	18	C		ML	SANDY SILT w/ gravel; 10YR 4/2 dk gray-sh brown; LOW TO MEDIUM PLASTICITY; MOIST. SAND V. FINE TO MEDIUM; SUB-ROUND ~~Gravel~~ GRAVEL FINE TO COARSE, SUB-ROUND	
					40					
2	65	25	10	0.0	103			GW-GM	well graded grand w/ silt and sand; 10YR 4/2 DK grayish BROWN; NO PLASTICITY; V. DENSE; ~~MOIST~~ MOIST. SAND V. FINE TO COARSE; SUB ANGULAR GRAVEL FINE TO COARSE, SUB-ANG TO SUB ROUND.	
					131					
3				TD=3 FT						
4										

SB-34-004R 13:14
004S 13:17
004C 13:27

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

TEAD-N PHASE II RFI
SOIL BORING LOG

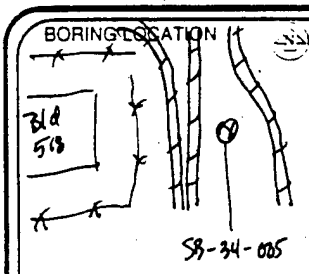
MONTGOMERY WATSON

PAGE 1 OF 1

PROJECT NO. 2942.0170

SB-34-005

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 34
Date Drilled: 10-24 Date Completed: 10-24-93
Logged By: BKH
Water Elevation (ft.): N/A
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 2.5"

Monitoring Well No.:
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 267' & 57' TO 34-1
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 HSA

Well Screen: Diameter Depth Slot Size
Casing: Diameter N/A Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	60	25	15	0.0	9 9			GM	SILTY GRAVEL W/ SAND; 10YR 3/2 V. DK GRAYISH BROWN; NO PLASTICITY; ~~LOOSE TO~~ MED DENSE; MOIST; SAND FINE TO COARSE; SUB-ANG GRAVEL - FINE TO COARSE, SUB-ANG TO ANGULAR	
1					24					
					13					
					31					
2					16				A-A-	
					21					
3							TD = 3'			
4										

SB-34-05K 13:46
05B 13:53
05C 13:57

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

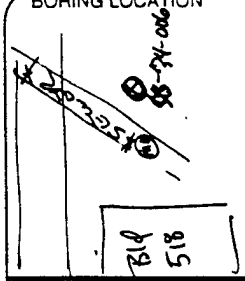
MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 34
Date Drilled: 10-24 Date Completed: 10-24-93
Logged By: BKH
Water Elevation (ft.): N/A
Date Measured:
Total Depth (ft.): 3
Diameter (in.): 2.5"

Monitoring Well No.: ~~SB-34-006~~
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 227°@ 54' To 34-2
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 - HSA

Well Screen: Diameter Depth Slot Size
Casing: Diameter N/A Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	20	55 ~~50~~	25 ~~30~~	0.0	9	C		SM	SILTY SAND w/ GRAVEL; 10YR 3/3 DK BROWN; ~~NO TO~~ LOW PLASTICITY; LOOSE; MOIST. SAND - FINE TO MEDIUM, SUB ROUND. GRAVEL - FINE TO COARSE, SUB-ROUND.	
					13					
1	5	70	~~35~~ 25		8			SM	SILTY SAND w/ GRAVEL; 10YR 4/4 DK YELLOWISH BR.; NO TO LOW PLASTICITY; LOOSE; MOIST. SAND V. FINE TO MED.; SUB ROUND TO SUB-ANGULAR. GRAVEL IS SPARCE, FINE, SUB ROUND.	
					18					
2	45	45 ~~50~~	10 ~~20~~		24			SW-SM	WELL GRADED SAND w/ GRAVEL; 10YR 4/3 DK BROWN; NO PLASTICITY; DENSE TO V. DENSE; SLIGHTLY MOIST ~~DRY~~; SAND V. FINE TO COARSE, SUB-ANG. GRAVEL - FINE TO COARSE, SUB ANG. TO SUB-ROUND. GRAVEL IS LIMESTONE	
					100					
3									TD=3 FT	
4										

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

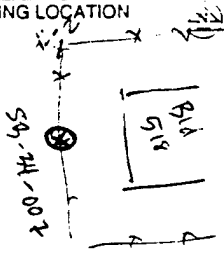
TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

SB-34-007

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 34
Date Drilled: 10-25 Date Completed: 10-25-93
Logged By: BKH
Water Elevation (ft.): N/A
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 25"

Monitoring Well No.:
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 2" TO 34-2@ 42'
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 HSA

Well Screen: Diameter Depth Slot Size
Casing: Diameter N/A Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	35	50	15	2	17	C		SM	SILTY SAND W/ GRAVEL; 10YR 3/2 - V. DK GRAYISH BROWN; NO PLASTICITY; MED. DENSE; MOIST. SAND FINE TO COARSE; SUB-ANGULAR. GRAVEL - FINE; SUB-ROUND.	
1					18					
					8					
					7		NR			
2	40	35	25		12		NR	CM	POOR RECOVERY SILTY GRAVEL W/ SAND; 10YR 3/2 - V. DK GRAYISH BROWN; SILT LENSES W/ LOW PLASTICITY & SOFT FINES; MEDIUM DENSE; MOIST. SAND FINE TO MEDIUM; SUB-ANGULAR. GRAVEL FINE TO COARSE; SUB-ROUND TO SUB-ANGULAR.	
					25		NR			
3					TD = 3'					
4										

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

SB-34-008

BORING LOCATION

Project: TEAD-N PHASE II RFI
SWMU No. 34
Date Drilled: 10-25 Date Completed: 10-25-93
Logged By: BKH
Water Elevation (ft.): N/A
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 2.5"
Well Screen: Diameter ____ Depth ____ Slot Size ____
Casing: Diameter N/A Length ____ Type ____
Sand ____ Bentonite Seal ____ Cement Grout Seal ____

Monitoring Well No.: ____
Northing: ____ Easting: ____
Ground Surface Elevation (ft.): ____
Measuring Point is Ground Surface
Datum: NGVD (1929) 130° @ 87' to 34-1
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 - HSA

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	24	45	20		11	C		SM	SILTY SAND w/ GRAVEL; 10YR 3/2 - dk grayish brown, NO PLASTICITY; LOOSE TO MED. DENSE; ~~DENSE~~ moist; SAND FINE TO COARSE, SUB-ANGULAR ~~TO SUB-RD~~ GRAVEL - FINE, SUB-ROUND.	
					10					
1	50	~~35~~ 30	~~15~~ 20		5	C		GM	SILTY GRAVEL w/ SAND; 10YR 3/2 - V. dk grayish BROWN; NO PLASTICITY; LOOSE TO MEDIUM DENSE; moist; SAND FINE TO COARSE, SUB-ANG. GRAVEL FINE TO ~~COARSE~~, SUB-round to ~~sub~~ angular.	
					9				Cobbles to 3"+	
2					110	C			A.A. very dense,	
					92					
3							TD=3'			
4										

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

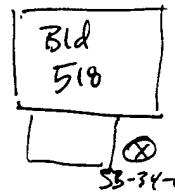
TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

SB-34-009

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No.
Date Drilled: Date Completed:
Logged By:
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 2.5"

Monitoring Well No.:
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface 145° @ 36' TO 34-1
Datum: NGVD (1929) 182° @ 57' TO 34-1 BM
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 HSA

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	~~5~~ 5	40	~~55~~ 55		5	C		ML	SANDY SILT w/ GRAVEL; 10YR 4/3 – BROWN TO DK BROWN; LOW TO MEDIUM PLASTICITY; ~~MED~~SOFT TO MEDIUM STIFFNESS; SLIGHTLY MOIST. SAND V. F. TO MEDIUM, SUB ROUND. GRAVEL - SPARSE, FINE, SUB-ROUND.	
					10					
1	50	30	20		30	C		GM	SILTY GRAVEL w/ SAND; 10YR 4/2 DK GRAYISH BROWN; NO PLASTICITY; DENSE TO V. DENSE; SL MOIST; SAND V. FINE TO FINE; SUB ROUND. GRAVEL TO 3", ANGULAR.	
					73					
2					157	C	5"		REFUSAL, NO RECOVERY	
							NR			
3							TD=3'			
4										

SB-34-009A 11:35
B 11:40
C 12:15

PROJECT NO. 2942.0170

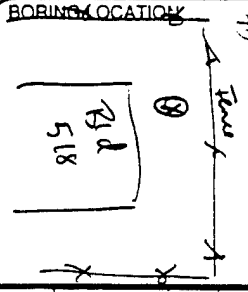
* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB-~~34~~ 34 -010

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 34
Date Drilled: 10-25 Date Completed: 10-25-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 25"

Monitoring Well No.: _____
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929) 182°C 57' TO 34-1
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 HSA

Well Screen: Diameter _____ Depth _____ Slot Size _____
Casing: Diameter NA Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	10	85	5	0.0	3	C		SP	POORLY GRADED SAND ~~with Gravel~~; 10YR 5/3 - Brown; NO PLASTICITY; LOOSE; SLIGHTLY MOIST; SAND - FINE; SUB ROUND TO SUB-ANGULAR.	
					8					
1									A.A.	
					9					
					17					
2	50	40	10		~~24~~ 24			GW-GM	well graded gravel w/ silt & sand; 10YR 4/2 dk grayish brown; NO PLASTICITY; V. DENSE; SL. MOIST. SAND FINE TO COARSE; SUB ANGULAR TO ANGULAR. GRAVEL - ~~SUB~~ FINE TO COARSE; SUB ROUND TO ANGULAR. COBBLES > 3" present. (LIMESTONE)	
					~~57~~ 57					
3							TD=3 FT			
4										

SB-34-DOA 13:40

B 13:42

13:44

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

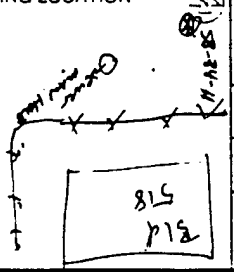
TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

SB-34-011

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 34
Date Drilled: 10-25 Date Completed: 10-25-98
Logged By: BKH
Water Elevation (ft.):
Date Measured: NA
Total Depth (ft.): 3 Ft
Diameter (in.): 2.5"

~~Monitoring Well~~ SB No.:
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 266' @ 266° TO 34-2

Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 - HSA

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	15	75	10	0.0	4	C		SP-SM	POORLY GRADED SAND w/ SILT AND GRAVEL; 10YR 4/3 BR TO DK BROWN; NO PLASTICITY; SLIGHTLY MOIST, LOOSE; SL. MOIST. SAND V. FINE TO FINE, SUB ROUND TO SUB-ANGULAR.	
					7					
1	5	60	35		5			SM	SILTY SAND; 10YR 3/4 dk yellowish brown; NO PLASTICITY; LOOSE; SL. MOIST; SAND V FINE TO FINE, SUB ANGULAR; SPARSE GRAVEL, FINE, SUB-ANG TO SUB-ANGULAR.	
					18					
2	45	45	10		28			GW-GM	well graded gravel w/ SILT AND SAND; 10YR 4/2 - dk grayish brown; NO PLASTI, DENSE TO V. DENSE; DRY TO SL. MOIST. AND FINE TO COARSE, SUB-ANG GRAVEL FINE TO COARSE, SUB ANG TO ANGULAR. COBBLES >3" present.	
					51					
3							TD=3'			
4										

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

TEAD-N PHASE II RFI
SOIL BORING LOG

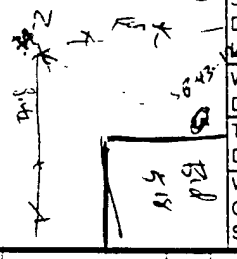
MONTGOMERY WATSON

PAGE 1 OF 1

PROJECT NO. 2942.0170

SB-34-012

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 34
Date Drilled: 10-25 Date Completed: 10-25-93
Logged By: BKM
Water Elevation (ft.): N/A
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 25"

~~Monitoring~~ SB Well No.:
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) -323" @ 54' TO 34-2
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 - HSA

Well Screen: Diameter Depth Slot Size
Casing: Diameter N/A Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	5	60	35	0.0	3	C		SM	SILTY SAND; 10YR 4/4 - dk yellowish BR; NO TO LOW PLASTICITY; LOOSE; SL. MOIST; SAND V. FINE TO FINE, SUB ROUND ~~TO SUB ANGULAR~~ GRAVEL - SPARCE, FINE, SUB ROUND.	
					3					
1	15	50	35		3			SM	SILTY SAND W/ GRAVEL; A.4. GRAVEL FINE TO COARSE, ANGULAR.	
					27					
2	55	35	10		47			GW-GM	well graded gravel w/ SILT AND SAND; 10YR 4/2 dk grayish brown; NO PLAST.; V. DENSE; DRY TO SL. MOIST; SAND ~~GRAVEL~~ V. FINE TO COARSE, ANGULAR GRAVEL - FINE TO COARSE, ANGULAR. V. COBBLES PRESENT >3" LIMESTONE	
					93					
3							TD=3 FT			
4										

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

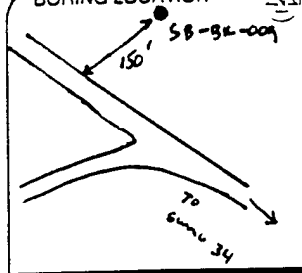
MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

BORING LOCATION



Project: TEAD-N PHASE II
SWMU No. 34
Date Drilled: 11-2-93 Date Completed: 11-2-93
Logged By: MJA / BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"
Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

~~Monitoring Well~~ No.: SB-BK-009
Northing: 150' Easting: 311° from 34-2
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

SB-BK-009A
0-1.5'
11-2-93
1018

SB-BK-009B
1.5-3.0'
1027

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)
0	20	60	20	0		SS	100	SM	Silty, gravelly, sand; very dark grayish brown (10YR 3/2); fine to coarse sand, angular to subrounded; gravel to 20 mm in dia., subrounded; loose; dry.
1									
2	70	20	10	0		SS	40	GM	Silty, sandy, gravel; light brownish gray (10YR 6/2); very fine to fine sand; gravel to 50 mm in diam subangular to rounded; loose; dry.
3									
4									

ELEVATION (FEET)

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

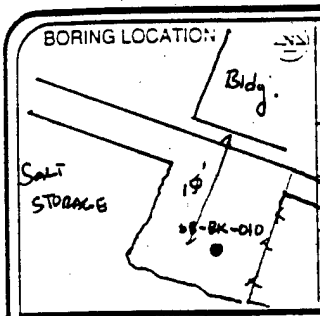
TEAD-N PHASE II RFI
SOIL BORING LOG

MONTGOMERY WATSON

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PROJECT NO. 2942.0170

BORING LOCATION:



Project: TEAD-N PHASE II
SWMU No. 34
Date Drilled: 11-2-93 Date Completed: 11-2-93
Logged By: MJA/BDH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 8"
Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

~~Monitoring Well No.~~: SB-BK-010
Northing: 150' Easting: 273° from 34-2
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: OVERLAND
Drilling Method: HSA

SB-BK-010A
0-1.5'
11-2-93
1049

SB-BK-010B
1.5-3.0'
1110

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	20	60	20	0		SS	80%	SM	Gravelly, silty, sand; grayish brown (10YR 5/2); very fine to medium sand, subrounded; gravel to 15mm in dia.) subangular to subrounded; loose; dry.	
1										
2	40	40	20	0			70	GM	Silty, sandy, gravel; dark grayish brown (10YR 4/2); very fine to medium sand, subrounded; gravel to 50 mm in dia.) angular to subrounded; loose; dry.	
3										
4										

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

TEAD-N PHASE II RFI
SOIL BORING LOG

MONTGOMERY WATSON

PAGE 1 OF 1

PROJECT NO. 2942 0170

CONTAMINATED WASTE PROCESSING PLANT
(SWMU 37)

SOIL BORING LOGS

SB-37-001

BORING LOCATION

VOC basement

3rd 1325

Project: TEAD-N
SWMU No. 37 / SB-001
Date Drilled: 10-6-93 Date Completed: 10-6-93
Logged By: MA/BH
Water Elevation (ft.): —
Date Measured: —
Total Depth (ft.): 3'
Diameter (in.): 3"

Monitoring Well No.: —
Northing: — Easting: —
Ground Surface Elevation (ft.): —
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: —
Drilling Method: HAND AUGER

Well Screen: Diameter — Depth — Slot Size —
Casing: Diameter — Length — Type —
Sand — Bentonite Seal — Cement Grout Seal —

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
sample 1:2:c @ 0	0	70	30	0	NA	HA		SM	silty sand; 10YR 6/4 - light yellowish brown; non-plastic; loose; dry; sand very fine to fine; sub-angular	
@ 1										
sample 1207 @ 2	2	65	33					SM	silty sand; 10YR 6/4 - light; non-plastic; loose; dry; sand-very fine to fine, sub-angular; gravel fine, sub angular (quartzite)	
sample 1211 @ 3								SM	silty sand as above; no odor	
4										

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

HA = HAND AUGER

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

SB-37-002

BORING LOCATION

Project: TCFD IV PHASE II RFI
SWMU No. 37
Date Drilled: 10-6-93 Date Completed: 10-6-93
Logged By: MA / BEM
Water Elevation (ft.): —
Date Measured: —
Total Depth (ft.): 3'
Diameter (in.): 3"
Monitoring Well No.: —
Northing: — Easting: —
Ground Surface Elevation (ft.): —
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: —
Drilling Method: HAND AUGER
Well Screen: Diameter — Depth — Slot Size —
Casing: Diameter — Length — Type —
Sand — Bentonite Seal — Cement Grout Seal —

SB-37-002
B1a 1525

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	1-2	80	18	0	NA	HA		SM	Silty SAND; 10YR 6/4 - light yellowish brown; NON-PLASTIC; LOOSE; SAND: V. fine to fine, sub angular. SPARSE fine gravel, sub-angular.	
1									A.A.	
2										
3									A.A. - SAND IS slightly moist.	
4										

Sampled 12:25
Sample 12:31
Sample 12:40

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water
HA - HAND AUGER

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

SB-37-003

BORING LOCATION

Project: TEAD-N PHASE II RFI
SWMU No. 37
Date Drilled: 10-6-93 Date Completed: 10-6-93
Logged By: MA / BKA
Water Elevation (ft.): —
Date Measured: —
Total Depth (ft.): 3'
Diameter (in.): 3"

Monitoring Well No.: —
Northing: — Easting: —
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor:
Drilling Method: HAND AUGER

Well Screen: Diameter Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	0	55	45	0	NA	HA		SM	SILTY SAND, 10YR 5/3 - BROWN; NONE to LOW PLASTICITY; DRY; sand VERY FINE, SUB-ANGULAR.	
1	12	53	45						A.A.	
2		60	40						SILTY SAND; 10YR 5/3 - BROWN; NO PLASTICITY, 100% FINE SAND VERY FINE, SUB-ANGULAR Weakly cemented - fizzes w/ HCl.	
3										
4										

13:40
13:44
13:47

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water
HA = HAND AUGER

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

SB37-004

BORING LOCATION

SB37-004

Project: TEAD-N PHASE II RFI
SWMU No. 37
Date Drilled: 10-6-93 Date Completed: 10-6-93
Logged By: JKH/MA
Water Elevation (ft.): —
Date Measured: —
Total Depth (ft.): 3'
Diameter (in.): 3"

Monitoring Well No.: —
Northing: — Easting: —
Ground Surface Elevation (ft.): —
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: NA
Drilling Method: Hand Auger

Well Screen: Diameter — Depth — Slot Size —
Casing: Diameter — Length — Type —
Sand — Bentonite Seal — Cement Grout Seal —

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0		80	20	0	NA	HA		SM	13:40 Silty SAND; 10YR 5/3 - brown, NON PLASTIC, loose; dry; sand v. fine sub angular; weakly calcareous.	
1									13:44 d.d.	
2									13:47 d.d.	
3										
4										

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water
HA - Hand Auger

MONTGOMERY WATSON

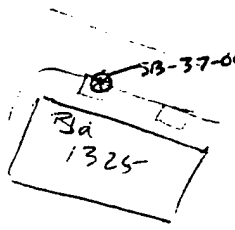
TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

SB-37-0005

BORING LOCATION



Project: TOOELE / PHASE II RFI
SWMU No. 37 SB-005
Date Drilled: 10-6 Date Completed: 10-6
Logged By:
Water Elevation (ft.):
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 3"

Monitoring Well No.:
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor:
Drilling Method: HAND AUGER

Well Screen: Diameter Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	2-3	55	42	0	NA	HA		SM	1407 SAMPLE A: SILTY SAND; 10YR 5/3 - brown; NO to LOW PLASTICITY; dry; Sand very fine, angular to sub angular, weakly calcareous. Gravel fine sub-angular.	
1								SM	1411 SAMPLE B: SILTY SAND; 10YR 4/4 dk yellowish brown; NON PLASTIC to LOW PLASTICITY; dry; Sand v. fine sub angular, weakly calcareous	
2		55	45							
3	5	60	35					SM	1416 SAMPLE C: SILTY SAND; 10YR 5/4 - brown; NON PLASTIC; dry; Sand v. fine to fine, angular to sub-angular, weakly calcareous	
4										

PROJECT NO. 2942.0170

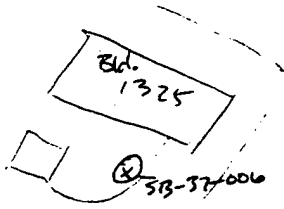
* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB-37-0006

BORING LOCATION



Project: TEAD-N, PHASE II RFI
SWMU No. 37
Date Drilled: 10-6-93 Date Completed: 10-6-93
Logged By: MA / BKH
Water Elevation (ft.): —
Date Measured: —
Total Depth (ft.): 3'
Diameter (in.): 3"

Monitoring Well No.: —
Northing: ____ Easting: ____
Ground Surface Elevation (ft.): ____
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: NA
Drilling Method: Hand Auger

Well Screen: Diameter — Depth — Slot Size —
Casing: Diameter — Length — Type —
Sand — Bentonite Seal — Cement Grout Seal —

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	5	75	20	0	NA	HA		SM	Silty SAND; 10YR 6/3 pale brown; non plastic; loose; dry; sand is v. fine to fine / subangular. Gravel fine to medium; sub angular to angular (probably fill) weakly calcareous.	
1									A.A silty sand as above; no gravel.	
2	0	70	30	0	NA	HA		SM		
3	90	10						SP	Poorly graded sand; 10YR 6/4 - light yellowish brown; non plastic; dry to slightly moist; sand fine to sub rounded to sub-angular; weakly calcareous.	
4										

Sampled 1433 A+Dup

1439 B

1457 C+Dup

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water
HA: Hand auger

MONTGOMERY WATSON

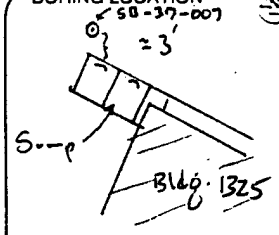
TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

SB-37-007

BORING LOCATION



Project: TEAD-N Phase II RFI
SWMU No. 37
Date Drilled: 11-9-93 Date Completed: —
Logged By: —
Water Elevation (ft.): —
Date Measured: —
Total Depth (ft.): 3'
Diameter (in.): 3"
Monitoring Well No.: —
Northing: — Easting: —
Ground Surface Elevation (ft.): —
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: —
Drilling Method: Hand Auger
Well Screen: Diameter — Depth — Slot Size —
Casing: Diameter — Length — Type —
Sand — Bentonite Seal — Cement Grout Seal —

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0										
SB-37-007 A 1010	0	90	10		N/A	AHOL		SP-SM	Brown (10YR 5/3) dry poorly-graded SAND w/SILT; about 90% v.f.-f to fine sub-rounded sand, non-plastic, loose. About 10% fines, non-plastic. No gravel. Mod. to Strong HCl reaction.	
1						AHOL	0%			
SB-37-007 B 1017						AHOL	100		As above, sand is slightly finer.	
2							100	SP		
SB-37-007C 1027	0	95	5			AHOL			Brown (10YR 5/3) slightly moist poorly-graded sand; about 95% v. fine to fine sub-rounded, mostly quartzite sand, loose. About 5% or less fines; non-plastic. No gravel.	
3									TD @ 3'	
4										

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

AHOL = Hand Auger

MONTGOMERY WATSON

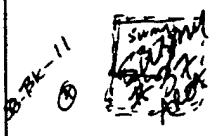
TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

SB - BK-11

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 37
Date Drilled: 10-6-93 Date Completed: 10-6-93
Logged By: BKH / MA
Water Elevation (ft.): —
Date Measured: —
Total Depth (ft.): 3'
Diameter (in.): 3"

Monitoring Well No.: N.A
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: N/A
Drilling Method: Hand Auger

Well Screen: Diameter N/A Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	0	55	45	0	NA	HA		SM	silty sand; 10YR-3/3 dk brown; NON to LOW PLASTICITY; loose; dry; sand-fine, sub rounded; slightly calcareous.	
1										
1	2	58	40					SM	A.A. 10YR 5/3 - brown. some gravel - fine, sub-angular.	
2										
3	2	60	38						A.A. 10YR 6/3 - pale brown;	
4										

Sample 10:16
10:20
Sample 10:30

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water
HA = Hand auger

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB - BK - 12

BORING LOCATION

SWMU 37

Project: TOOELE / PHASE II RFI
SWMU No. 37 BK-12
Date Drilled: 10-6 Date Completed: 10-6
Logged By:
Water Elevation (ft.): 0
Date Measured: 0
Total Depth (ft.): 3'
Diameter (in.): 3"

Monitoring Well No.: 0
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: 0
Drilling Method: HAND AUGER

Well Screen: Diameter 0 Depth 0 Slot Size 0
Casing: Diameter 0 Length 0 Type 0
Sand 0 Bentonite Seal 0 Cement Grout Seal 0

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	2	53	45	0	NA	HA		SM	1055 SAMPLE A — SILTY SAND; 10YR 5/3 - brown, NO TO LOW PLASTICITY; loose; dry, sand v. fine to fine g sub round to sub angular. Slightly calcareous	
1	3	32	65	0	NA	HA		ML-SM	~~Silty sand~~ - sandy silt; 10YR 5/4 yellowish brown; LOW PLASTICITY; loose; dry; sand very fine, sub-round ~~slight~~ calcareous	
2										
3	3	30	67					ML-SM	1108 SAMPLE B	
4										

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

HA = Hand Auger

TEAD-N PHASE II RFI
SOIL BORING LOG

MONTGOMERY WATSON

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PROJECT NO. 2942.0170

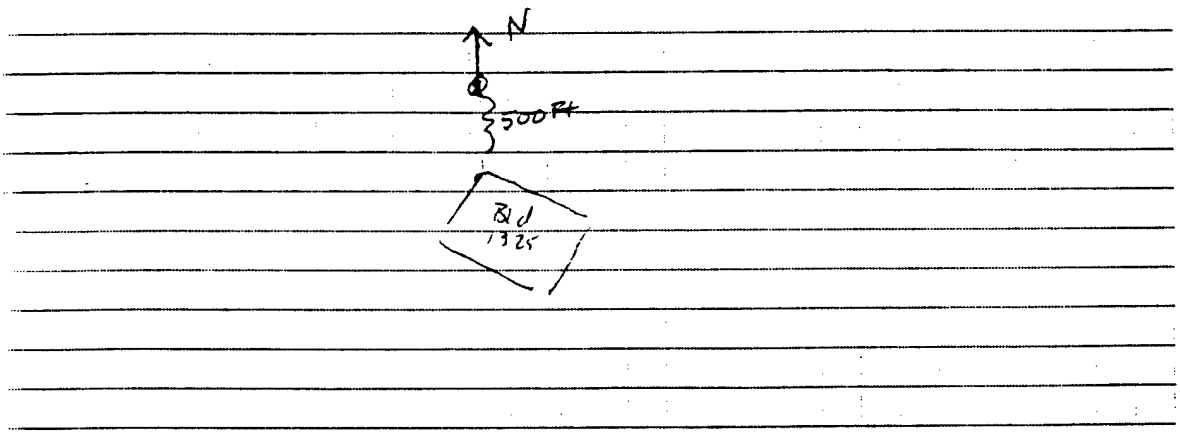
CONTAMINATED WASTE PROCESSING PLANT
(SWMU 37)

SURFACE SOIL SAMPLING LOGS

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-87-13
DATE SAMPLED: 10-5-93
TIME: 15.00
WEATHER CONDITIONS: Overcast, windy from South, 80°F
LOCATION OF SAMPLING REFERENCE POINT: North of Rd 1325 500 Ft

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi. moisture. plast.)	HNU READINGS	TYPE SAMPLE (Circle)
~~0.5~~ Ft 2"	SM	Brown 10YR ~~6/3~~, 70% sand rising to fine, dry ~~to moist~~ low plasticity to below plasticity lab - angular.	0.0	Grab (Composite) Other

Comment:

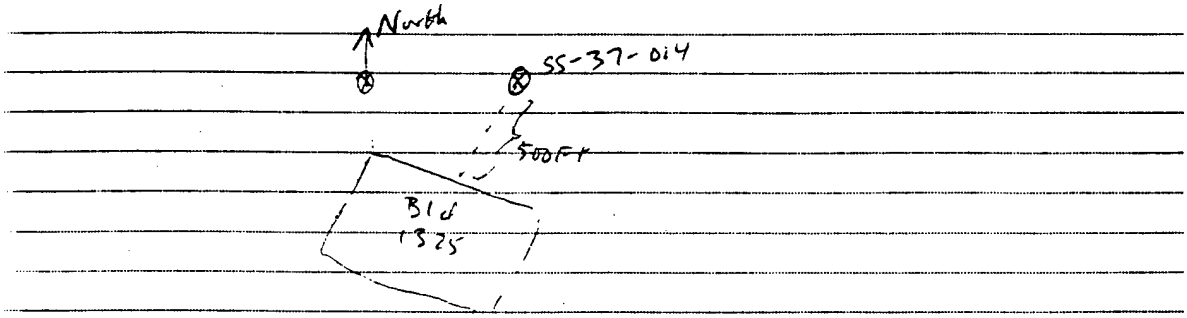
PROJECT NO. 42.0170

MONTGOMERY WATSON

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-37-014 + SS-37-DP121 @ 18:00
DATE SAMPLED: 10-5-93
TIME: 15:15
WEATHER CONDITIONS: overcast, windy from south ~ 20°'s
LOCATION OF SAMPLING REFERENCE POINT: NE

Meters N.S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fl, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0-2 FT 2"	SM	silty sand BR-10YR 4/3, ~70% very fine to fine sand, 30% fines, non-low plasticity fines, moist, subangular	0.0	Grab (Composite) Other

Comment:
Collect DUP SS-37-DP121 @ 18:00
Collect 1 liter WOD Sample for reference

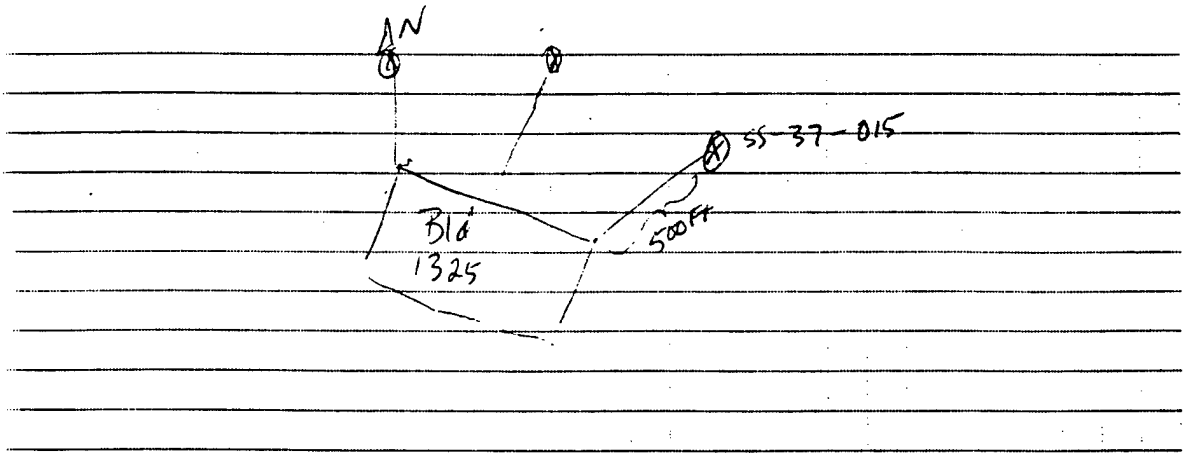
MONTGOMERY WATSON

PROJECT NC 142.0170

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-37-015
DATE SAMPLED: 10-5-93
TIME: 15:30
WEATHER CONDITIONS: overcast, windy ~80°F
LOCATION OF SAMPLING REFERENCE POINT: SE

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
~~1.5~~ FT 2"	SM	SILTY SAND, BL - 10YR 4/3, 70% V FINE TO FINE SAND, DRY, NO TO LOW PLASTICITY, SUB-ANGULAR	0.0	Grab (Composite) Other

Comment:

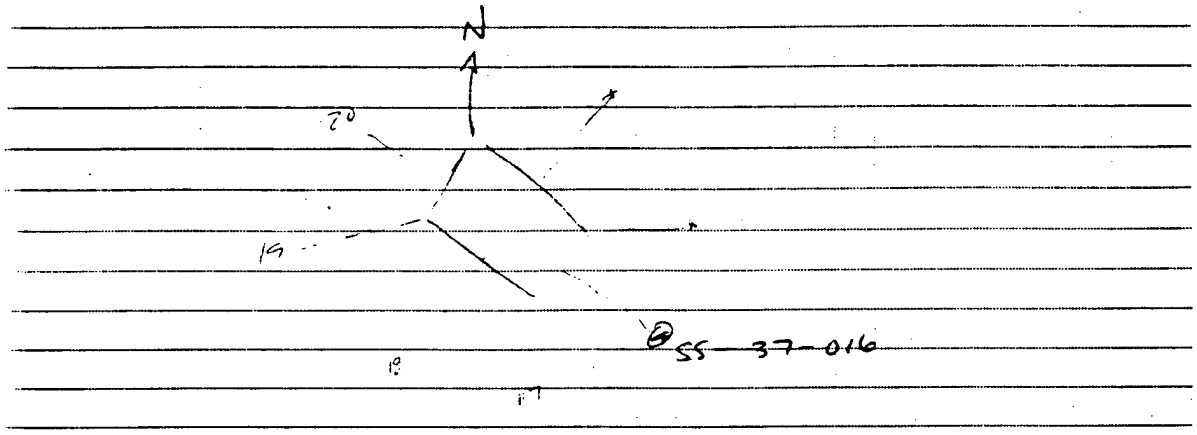
PROJECT NO. 12.0170

MONTGOMERY WATSON

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-37-016
DATE SAMPLED: 10-5-93
TIME: 15:45
WEATHER CONDITIONS: overcast, south wind ~80°F
LOCATION OF SAMPLING REFERENCE POINT: SE

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0.5 Ft	SM	SILTY SAND, 5R 10YR/4/3, 60% v. fine to medium sand; 40% fines, dry, 0 to low plasticity, sub angular	0.0	Grab (Composite) Other

Comment:

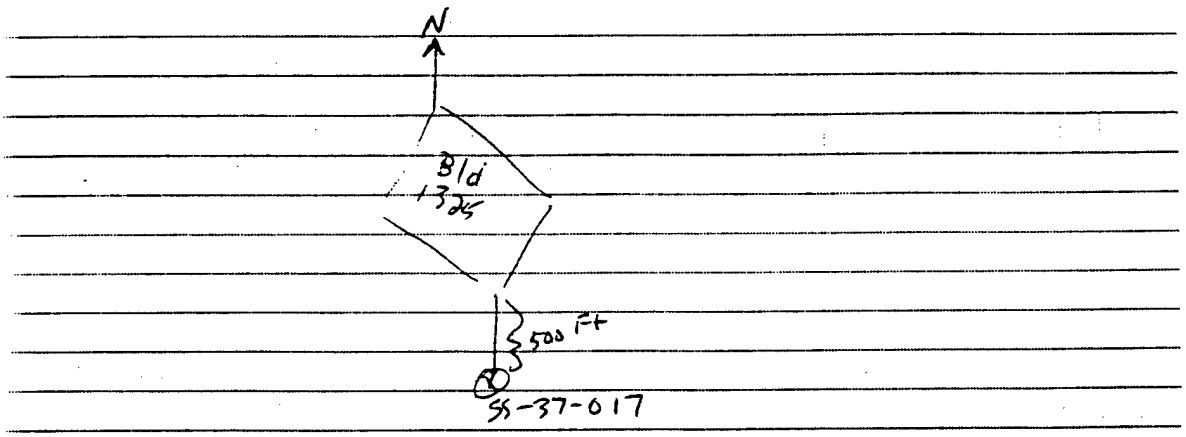
PROJECT NO. 42.0170

MONTGOMERY WATSON

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-37-017
DATE SAMPLED: 10-5-93
TIME: 11:00
WEATHER CONDITIONS: Overcast, South wind ~20 Kn. ~75 °F
LOCATION OF SAMPLING REFERENCE POINT: South

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa. % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
~~0-1~~ 2"	SM	Silty SAND, BR - 10YR 4/3, 60% v. fine to medium SAND/ 40% fines, dry, No to Low PLASTICITY, sub ang.	0.0	Grab (Composite) Other

Comment:

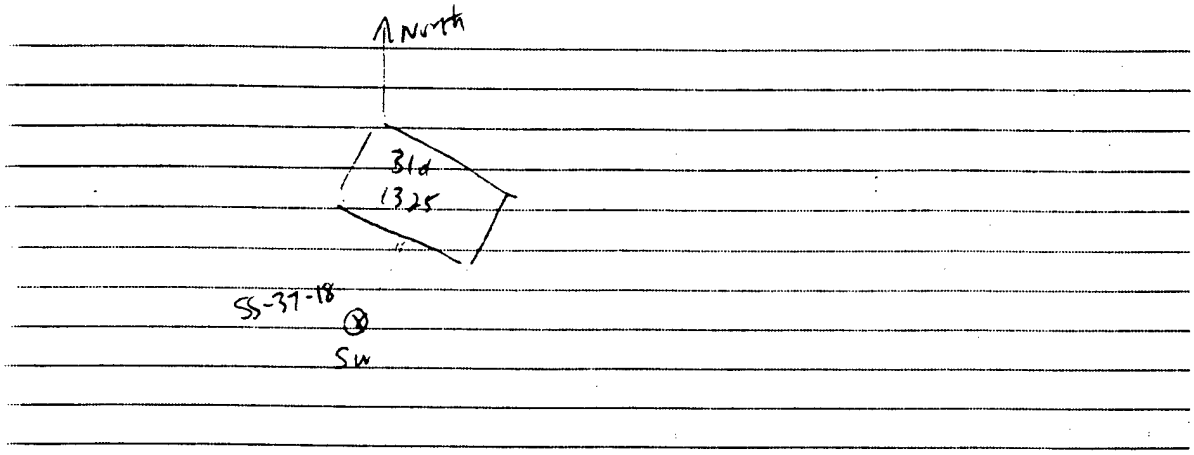
PROJECT NO 42.0170

MONTGOMERY WATSON

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-37-018
DATE SAMPLED: 10-5-93
TIME: 16:15
WEATHER CONDITIONS: Overcast, calm ~75°F
LOCATION OF SAMPLING REFERENCE POINT: SW

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
2"	SM	same description as previous	0.0	Grab (Composite) Other

Comment:

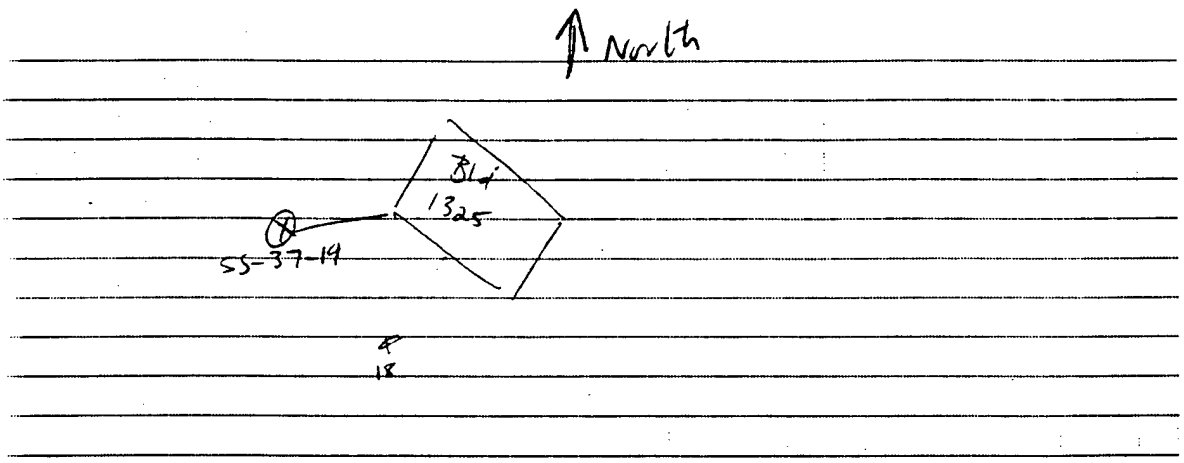
PROJECT NC 142.0170

MONTGOMERY WATSON

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-37-~~015~~ 019
DATE SAMPLED: 10-5-93
TIME: 16:~~30~~
WEATHER CONDITIONS: overcast, looks like rain
LOCATION OF SAMPLING REFERENCE POINT: west

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color. % gv, % sa. % fi. moisture. plast.)	HNU READINGS	TYPE SAMPLE (Circle)
2" ~~3-5~~ Ft	SM	same description	0.0	Grab (Composite) Other

Comment:

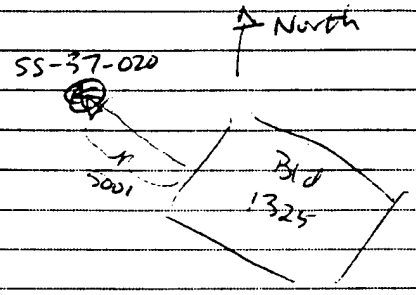
PROJECT NO. 42.0170

MONTGOMERY WATSON

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-37-020
DATE SAMPLED: 10-5-93
TIME: 16:30
WEATHER CONDITIONS: overcast, ~75°F calm
LOCATION OF SAMPLING REFERENCE POINT: NW

Meters N.S _____
Meters E.W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
2"	SM	same description	0.0	Grab (Composite) Other

Comment:

Baked Ham Wood sample at this location

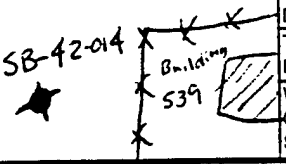
PROJECT No. 942.0170

MONTGOMERY WATSON

BOMB WASHOUT BUILDING
(SWMU 42)

SOIL BORING LOGS

BORING LOCATION



Project: PHASE # RFI TEAD-N
SWMU No. 42
Date Drilled: 11-3-93 Date Completed: 11-3-93
Logged By: BRIAN MAMOS
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 100'
Diameter (in.): 9"

~~Monitoring Well~~ No.: SB-42-014
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: CAYNE
Drilling Method: PERCUSSION HAMMER

Well Screen: Diameter NA Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
0	TR	60	40	0	8	SS	60%	SC	SILTY, CLAYEY, SAND; DARK BROWN (7.5YR 3/3); FINE TO MEDIUM SAND, ROUNDED; TRACE ROUNDED GRAVEL TO 15MM IN DIA.; MODERATE PLASTICITY; MEDIUM DENSE; MOIST
1					9				
					8				
2					8				
3									
4									

Sample interval

ELEVATION (FEET)

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

TEAD-N PHASE II RFI
SOIL BORING LOG

MONTGOMERY WATSON

PAGE 1 OF 11

PROJECT NO. 2942.0170

Project: SWMU 42

JMM Boring No.: SB-42-014

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
5	45	40	15	0	5	SS	50%	GM GM	SANDY GRAVEL; LIGHT BROWNISH GRAY (10YR 6/2); 15% SILT; ~~ANGULAR TO ROUNDED~~ FINE TO COARSE SAND, SUBANGULAR TO SUBROUNDED; GRAVEL FROM 2mm TO 30mm IN DIA.; ANGULAR TO ROUNDED; NON-PLASTIC; LOOSE; DRY
					21				
6					32				
					30				
7									
8									
9									
10	85	10	5	0	15	SS	50%	GM	SANDY GRAVEL; GRAY (10YR 5/1); VERY FINE TO FINE SAND, ANGULAR; GRAVEL FROM 2mm TO 50 mm IN DIA, SUBROUNDED; NON-PLASTIC; LOOSE; DRY
					19				
11					50 for 4"				
12									
13									
14									

Sample interval

PROJECT NO. _____

Project: Swmn 42
JMM Boring No.: SB-42-014

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
15				0	9	SS	60%	GM	AS ABOVE	
					15					
16					14					
					17					
17										
18										
19										
20	10	30	-	0	10	SS	40%	GW	SANDY GRAVEL; LIGHT BROWNISH GRAY (10YR6/2); VERY FINE SAND TO GRAVEL 30 mm IN DIA.) ANGULAR TO SUBROUNDED; NON-PLASTIC; LOOSE; DRY	
					23					
21					28					
					37					
22										
23										
24										

PROJECT NO. _____

Project: SWMU 42

JMM Boring No.: SB-42-014

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
25				0	5	SS	10%	GW	AS ABOVE	
					18					
26					17					
					15					
27										
28										
29										
30				0	9	SS	50%	GW	AS ABOVE	
					13					
31					17					
					18					
32										
33										
34										

PROJECT NO. ____ ____

Project: SWMU 42
JMM Boring No.: SB-42-014

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
35		90	10	0	10	SS	50%	SC	CLAYEY SAND; BROWN (10YR5/3); VERY FINE TO FINE GRAINED, SUBANGULAR; NON-PLASTIC; MEDIUM DENSE; ~~MOIST~~	
					47					
36					21					
					17					
37										
38										
39										
40		15	85	0	8	SS	100%	CL	SANDY CLAY; LIGHT BROWNISH GRAY (10YR 6/2); VERY FINE SAND; MEDIUM PLASTICITY; SOFT; MOIST TO WET.	
		~~15~~	~~85~~	~~50H~~	6					
41					5					
					6					
42										
43										
44										

PROJECT NO. _____

Project: SWMU 47

JMM Boring No.: SB-42-014

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
45				0	3	SS	100	CL	AS ABOVE	
					5					
46					4					
					6					
47										
48										
49										
50		5 / 80	95 / 20	0	6	SS	100	CL / SC	CLAYEY SAND TO SANDY CLAY; LIGHT BROWNISH GRAY (2.5Y 6/2); THINNLY INTERBEDDED (<20 mm); SAND IS	
					8				VERY FINE, SUBANGULAR; MEDIUM PLASTICITY; MEDIUM STIFF; MOIST TO WET.	
51					9					
					10					
52										
53										
54										

PROJECT NO. _____

Project: SWMH 42
JMM Boring No.: SB-42-014

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
55		5	95	0	4	SS	100%	CL	CLAY; LIGHT BROWNISH GRAY (2.5Y 6/2); SOME FINE SAND; MEDIUM PLASTICITY; MEDIUM STIFF; MOIST	
					6					
56					11					
	10	10	80	0	13			CL	SANDY, GRAVELLY, CLAY; (2.5Y 6/2); FINE SAND TO GRAVEL 20 mm IN DIA., ROUNDED; MEDIUM PLASTICITY;	
57									MEDIUM STIFF; MOIST.	
58										
59										
60	10	10	20	0	9	SS	40%	GC	SANDY, CLAYEY, GRAVEL; LIGHT GRAY (10YR 7/1); FINE TO COARSE SAND, SUBANGULAR; GRAVEL TO 25 mm IN DIA.; SUBANGULAR TO SUBROUNDED; LOW PLASTICITY; LOOSE; DRY	
					15					
61					20					
					50 for 4"					
62										
63										
64										

PROJECT NO. _____

Project: SWMU 42

JMM Boring No.: SB-42-014

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
65				0	5	SS	20%	GC	AS ABOVE
					10				
66					17				
					31				
67									
68									
69									
70	95		5	0	3	SS	5%	GW	GRAVEL; GRAYISH BROWN (10YR 5/2); SOME CLAY MATRIX; GRAVEL FROM 4 mm TO 20 mm IN DIA; ROUNDED; NON-PLASTIC; LOOSE; DRY.
					27				
71					50 FOR 4"				
72									
73									
74									

PROJECT NO. _____

Project: SWMU 42

JMM Boring No.: SB-42-014

DEPTH (FEET)	GRAIN SIZE: % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
75				0	10	SS	40%	GW	AS ABOVE	
	10	20	10		13			GM	SILTY, SANDY, GRAVEL; LIGHT GRAY (10YR 7/2); FROM VERY FINE SAND TO GRAVEL UP TO 30 mm IN DIA; ANGULAR TO SUBROUNDED; LOW PLASTICITY; LOOSE; DRY.	
76					22					
					35					
77										
78										
79										
80	10	15	15	0	26	SS	30%	GC	SANDY, CLAYEY, GRAVEL; BROWN (10YR 5/3); FROM VERY FINE SAND TO GRAVEL 40 mm IN DIA.; SUBANGULAR; MEDIUM PLASTICITY; SOFT; MOIST.	
					50 FOR 3"					
81										
82										
83										
84										

PROJECT NO. _____

Project: SWMU 42

JMM Boring No.: SB-42-014

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
85									NO SAMPLE RECOVERY, ROCK IN SAMPLER.	
86										
87										
88										
89										
90	80	20		0	4	SS	10%	GW	GRAVEL; LIGHT GRAY (10YR 7/1); FROM FINE SAND TO GRAVEL 25 mm IN DIA.; ANGULAR TO SUBROUNDED; NON-PLASTIC; LOOSE; DRY.	
					13					
91					23					
					25					
92										
93										
94										

PROJECT NO. _____

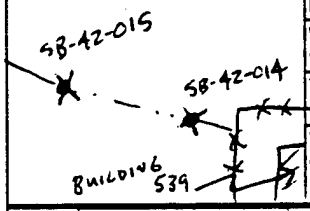
Project: SWMU 12

JMM Boring No.: SB-12-014

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
95	TR		100	0	50 for 2"	SS	5%	CL	CLAY; BROWN (10YR 4/3); TRACE GRAVEL UP TO 20mm; SUBROUNDED; MEDIUM PLASTICITY; SOFT; MOIST.	
96										
97										
98										
99										
100	15	5	20	0	7	SS	30%	GC	SANDY, CLAYEY, GRAVEL; BROWN (7.5YR 4/3); VERY FINE SAND; GRAVEL TO 25mm IN DIA.; SUBROUNDED;	
					14				PLASTIC; SOFT; MOIST TO DRY.	
101					17				T.D. HOLE @ 100', SAMPLE TO 102'.	
					32					
102										
3										
4										

PROJECT NO. _____

BORING LOCATION



Project: PHASE II RFI TEAD-N
SWMU No. 42
Date Drilled: 11-4-93 Date Completed: 11-5-93
Logged By: BRIAN HAMOS
Water Elevation (ft.): NA
Date Measured: —
Total Depth (ft.): 100'
Diameter (in.): 9"

~~Monitoring Well~~ No.: SB-42-015
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: LAYNE
Drilling Method: PERCUSSION HAMMER

Well Screen: Diameter NA Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	65	15	20	0	13	SS	10%	~~SC~~ BDH GM	SANDY, SILTY, GRAVEL; DARK GRAYISH BROWN (10YR4/2); VERY FINE SAND; GRAVEL TO 40 MM IN DIA; SUBANGULAR TO ROUNDED; NON-PLASTIC; LOOSE; DRY	
					11					
1					50 FOR 2"					
2										
3										
4										

Sample interval

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

Project: SWMU 42

JMM Boring No.: SB-42-015

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5					50 FOR 5"	SS	0		NO RECOVERY	
6										
7										
8										
9										
10	70	15	15	0	50 FOR 3"	SS	0	GM	NO RECOVERY. CYCLONE CUTTINGS: GM - SILTY, SANDY, GRAVEL; PALE BROWN (10YR 6/3); VERY FINE SAND TO COBBLES (20 MM IN DIA) SUBROUNDED; NON-PLASTIC; LOOSE, DRY.	
11										
12										
13										
14										

Sample interval

PROJECT NO. _____

Project: SWMU 42
JMM Boring No.: SB-42-015

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FT)
15	60	25	15	0	18	SS	70%	GM	SILTY, SANDY, GRAVEL; LIGHT BROWNISH GRAY (10YR 6/2); VERY FINE SAND TO GRAVEL 25 mm IN DIA.; SUBROUNDED;	
					33				NON-PLASTIC; DRY MEDIUM DENSE	
16					36					
					38					
17										
18										
19										
20	10	30		0	23	SS	60%	~~GM~~ GW SM	~~SILTY~~ SANDY, GRAVEL; PALE BROWN (10YR 6/3); FINE SAND TO GRAVEL 30 mm IN DIA.) SUBROUNDED; NON-PLASTIC;	
					45				MEDIUM DENSE; DRY.	
21					50 FOR 5"					
22										
23										
24										

PROJECT NO. _____

Project: Swmu 42

JMM Boring No.: SB-42-015

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
25				0	5	SS	10%	GW	AS ABOVE	
					21					
26					50 For 5"					
27										
28										
29										
30				0	9	SS	10%	GW	AS PREVIOUS.	
					40					
31					50 For 4"					
32										
33										
34										

PROJECT NO. _____

Project: SWMH 42
JMM Boring No.: SB-42-015

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
35		80	20	0	12	SS	90%	SM	SILTY SAND; BOR LIGHT YELLOWISH BROWN (2.5Y 6/3); FINE SAND; ANGULAR TO SUBROUNDED; LOOSE; WELL SORTED; MOIST
			100		9			CH	CLAY; LIGHT YELLOWISH BROWN (2.5Y 6/3); HIGH PLASTICITY;
36					12			SM	VERY SOFT; MOIST → AS PREVIOUS
					7				
37									
38									
39									
40				0	6	SS	90%	SM	AS ABOVE
		80	20		11			SC	SILTY CLAYEY SAND; LIGHT YELLOWISH BROWN (2.5Y 6/3); AS ABOVE EXCEPT MORE CLAY (~10% CLAY).
41					12				
					15				
42									
43									
44									

PROJECT NO. _____

Project: SWMH 42
JMM Boring No.: SB-42-015

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
45		45	55	0	4	SS	100%	CL	SANDY CLAY; LIGHT GRAY (2.5Y 7/1); FINE SAND; SUBROUNDED; MEDIUM PLASTICITY; SOFT; MOIST TO WET	
46					6					
					6					
47					13					
48										
49										
50				0	6	SS	100%	CL	AS ABOVE	
					7					
51					5					
					10					
52										
53										
54										

PROJECT NO. _____

Project: SWMM 42

JMM Boring No.: SB-42-95

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
55									NO SAMPLE TAKEN. CYCLONE CUTTINGS AS ABOVE.	
56										
57										
58										
59										
60			100	0	6	SS	100%	CL	SILTY CLAY; YELLOWISH BROWN (10YR5/4); LOW PLASTICITY; MEDIUM STIFF; MOIST.	
61					6					
					10					
					18					
62										
63										
64										

PROJECT NO. _____

Project: SWMU 42

JMM Boring No.: SB-42-015

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
65	55	20	25	0	21	SS	30%	GC	SANDY, CLAYEY, GRAVEL; LIGHT YELLOWISH BROWN (10YR 6/4); FINE TO COARSE SAND, SUBANGULAR TO SUBROUNDED; GRAVEL TO 40 mm IN DIA; SUBROUNDED; MEDIUM PLASTICITY; MEDIUM DENSE; MOIST	
					18					
66					22					
					31					
67										
68										
69										
70	70	15	15	0	7	SS	10%	GC	CLAYEY, SANDY, GRAVEL; PALE BROWN (10YR 6/3); FINE TO COARSE SAND, ANGULAR TO SUBROUNDED; GRAVEL TO 40 mm IN DIA.; SUBANGULAR TO SUBROUNDED; NON-PLASTIC; LOOSE; DRY.	
					18					
71					50 FOR 2"					
72										
73										
74										

PROJECT NO. _____

Project: SWMU 42
JMM Boring No.: SB-42-015

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
75				0	14	SS	45%	GC	AS ABOVE.
					32				
76					40				
		100			42			SP	SAND; LIGHT BROWNISH GRAY (2.5Y 6/2); VERY FINE TO FINE GRAINED, WELL SORTED; SUBANGULAR TO ROUNDED;
77									MEDIUM DENSE; DRY TO MOIST.
78									
79									
80				0	6	SS	45%	GC	AS PREVIOUS.
					11				
81					30				
					50				
82									
83									
84									

PROJECT NO. _____

Project: SWMU 42
JMM Boring No.: SB-42-015

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
85					50 FOR 5"	SS	0%	GC	NO RECOVERY. CYCLONE CUTTINGS AS ABOVE.	
86										
87										
88										
89										
90	65	20	15	0	23	SS	10%	GM	SANDY, SILTY GRAVEL; GRAY (10YR 5/1); FINE TO COARSE SAND; ANGULAR TO SUBANGULAR; GRAVEL TO 40 MM INDIA.; NON-PLASTIC; LOOSE; DRY	
91					35					
					50					
92										
93										
94										

PROJECT NO. _____

Project: SWMU 42

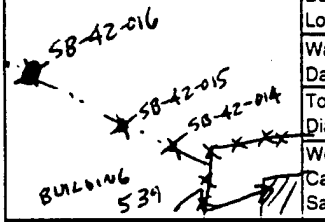
JMM Boring No.: SB-42-015

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
95	85	15		0	21	SS	5%	GW	SANDY GRAVEL; GRAYISH BROWN (10YR 5/2); MEDIUM TO COARSE SAND, ANGULAR; GRAVEL TO 25 MM, SUBANGULAR;
					50 FOR 4"				NON-PLASTIC; LOOSE; DRY.
96									
97									
98									
99									
100				0	11	SS	10%	GW	AS ABOVE.
					17				
101					31				
					50 FOR 5"				
102									T.D. HOLE @ 100'.
									SAMPLE TO 102'.
3									
4									

PROJECT NO. _____

BORING 6

BORING LOCATION



Project: PHASE II RFI TEAD-N
SWMU No. 42
Date Drilled: 11-5-93 Date Completed: 11-8-93
Logged By: BRIAN HAMOS
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 100'
Diameter (in.): 9"

~~Monitoring Well~~ No.: SB-42-016
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: LAYNE
Drilling Method: PERCUSSION HAMMER

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	BDH 65 55	20	25	0	16 BDH 12	SS	50%	GC	CLAYEY, SANDY, GRAVEL; PALE BROWN (10YR6/3); FINE TO COARSE SAND, SUBANGULAR) GRAVEL TO 20 MM IN DIA, ANGULAR TO SUBROUNDED; MEDIUM PLASTICITY; MEDIUM STIFF; MOIST.	
1	21 BDH 15									
	19 BDH 10									
2	21 BDH 14									
3										
4										

sample interval

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 11

PROJECT NO. 2942.0170

Project: SWMU 42

JMM Boring No.: SB-42-016

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5	50	50		0	16	SS	80%	GW	SANDY GRAVEL; BROWN (10YR5/3); FINE TO VERY COARSE SAND, SUBROUNDED; GRAVEL TO 20 mm IN DIA; SUBROUNDED; NON-PLASTIC; LOOSE; DRY	
					21					
6					19					
					21					
7										
8										
9										
10				0	10	SS	45%	GW	AS ABOVE.	
					15					
11					19					
					16					
12										
13										
14										

Sample interval

PROJECT NO. _____

Project: SWMU 42

JMM Boring No.: SB-42-016

DEPTH (FEET)	GRAIN SIZE: % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
15				0	9	SS	50%	GW	AS ABOVE.	
					16					
16					17					
					18					
17										
18										
19										
20					14	SS	0%		NO RECOVERY - ROCK IN SAMPLER.	
					50 FOR 5"					
21										
22										
23										
24										

PROJECT NO. _____

Project: SWMU 42
JMM Boring No.: SB-42-016

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
25	55	40	5	0	12	SS	50%	GW	SANDY GRAVEL; BROWN (10YR 5/3); FINE TO COARSE SAND, GRAVEL TO 20 mm IN DIA, SUBANGULAR TO SUBROUNDED; NON-PLASTIC; LOOSE; MOIST.
					19				
26					18				
					23				
27									
28									
29									
30				0	15	SS	50%	GW	AS ABOVE.
					24				
31					21				
					20				
32									
33									
34									

PROJECT NO. _____

Project: SWMU 42
JMM Boring No.: SB-42-06

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity; density: moisture content: additional facts)	ELEVATION (FEET)
35	50	50		0	50 FOR 5"	SS	10%	GW	SANDY GRAVEL; LIGHT GRAY (10YR 7/2); FINE SAND, ROUNDED; GRAVEL TO 30 mm IN DIA., SUBROUNDED TO ROUNDED; NON-PLASTIC; SOFT; DRY.	
36										
37										
38										
39										
40			100	0	4	SS	100%	CH	CLAY; LIGHT GRAY (2.5Y 7/2); HIGH PLASTICITY; SOFT; MOIST TO WET	
					10					
41		70	30		14			SC	CLAYEY SAND; GRAYISH BROWN (2.5YR 5/2); FINE TO MEDIUM SAND, ANGULAR TO SUBROUNDED; SOFT; MOIST TO WET.	
					14			CH	AS ABOVE.	
42										
43										
44										

PROJECT NO. _____

Project: SWMU 42
JMM Boring No.: SB42-016

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FT)
45				0	5	SS	100%	CH	AS ABOVE	
					8					
46					11					
					12					
47										
48										
49										
50				0	6	SS	60%	CH	AS ABOVE	
		60	40		8			SC	CLAYEY SAND; GRAYISH BROWN (2.5YR 5/2); FINE TO MEDIUM SAND; SUBROUNDED; MEDIUM DENSE; MOIST TO WET.	
51	5	55	40		50 FOR 3"			SC	AS ABOVE EXCEPT TRACE (5%) GRAVEL TO 20mm IN DIA; SUBANGULAR.	
52										
53										
54										

PROJECT NO. _____

11-2-93

Project: Swmu 42

JMM Boring No.: SB-42-016

DEPTH (FEET)	GRAIN SIZE: % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5 5			100	0	10	SS	100%	CL	SILTY CLAY; BROWN (10YR5/3); LOW PLASTICITY; MEDIUM STIFF; DRY	
					19					
5 6					20					
					30					
5 7										
5 8										
5 9										
6 0		40	60	0	20	SS	100%	CL	SILTY, SANDY, CLAY; BROWN (10YR5/3); FINE SAND, ANGULAR TO ROUNDED; SOFT; DRY	
					21				LOW PLASTICITY	
6 1					17			~~CL~~	BDH	
					19					
6 2										
6 3										
6 4										
6 5										

PROJECT NO. _____

11-6-93

Project: SWMU 42
JMM Boring No.: SB-92-016

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity; density: moisture content: additional facts)
65				0	6	SS	100	CL	AS ABOVE
					10				
66					14				
					14				
67									
68									
69									
70	70	30		0	15	SS	100	SM	SILTY SAND; GRAYLICYR 6/1); VERY FINE SAND, ANGULAR TO SUBROUNDED; MEDIUM DENSE; DRY; VERY WELL SORTED.
					26				
71					20				
					27				
72									
73									
74									

11-8-93

PROJECT NO. ____

Project: SWMU 42

JMM Boring No.: SB-42-016

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
75				0	4	SS	100%	SM	AS ABOVE.	
					17					
76					20					
					25					
77										
78										
79										
80									SANDY,	
	60	10	30	0	9	SS	20%	GC	CLAYEY GRAVEL; BROWN (10YR 5/3); FINE SAND, SUBROUNDED; ~~MEDIUM PLASTICITY~~; 30% GRAVEL TO 20 MM DIA., SUBROUNDED; MEDIUM PLASTICITY; SOFT; MOIST.	
					20					
81	60	40			50 FOR 3"			GW	SANDY GRAVEL; LIGHT GRAY (10YR 5/2); FROM FINE SAND TO GRAVEL 30 MM DIA.; SUBANGULAR TO SUBROUNDED; LOOSE; DRY.	
82										
83										
84										

PROJECT NO.

Project: SWMU 42
JMM Boring No.: SB-42-016

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FT)
85	50	10	40	0	10	SS	30%	GC	SANDY, CLAYEY, GRAVEL; PALE BROWN (10YR6/3); VERY FINE SAND; ANGULAR; GRAVEL TO 40 mm IN DIA.; SUBROUNDED; MEDIUM PLASTICITY; SOFT; MOIST.	
					43					
86					37					
					50 for 3"					
87										
88										
89										
90				0	7	SS	45%	GC	AS ABOVE.	
					16					
91					19					
					34					
92										
93										
94										

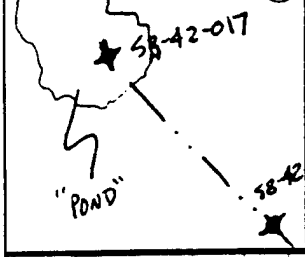
PROJECT NO. _____

Project: SWMM 42
JMM Boring No.: SB-42-016

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
95	70	10	20	0	6	SS	40%	GC	SANDY, CLAYEY, GRAVEL; YELLOWISH BROWN (10YR 5/4); FINE SAND, GRAVEL TO 40 mm IN DIA., ANGULAR TO SUBROUNDED; MEDIUM PLASTICITY; SOFT; MOIST.	
					12					
96					24					
					36					
97										
98										
99										
100	50	30	20	0	12	SS	50%	GM	SILTY SANDY, GRAVEL; LIGHT YELLOWISH BROWN (10YR 6/4); FINE TO COARSE SAND, ANGULAR TO SUBROUNDED,	
					16				GRAVEL TO 40 mm IN DIA., SUBANGULAR TO SUBROUNDED; LOOSE; DRY	
101					27				T.D. HOLE @ 100', SAMPLE TO 102'	
					10					
102										
3										
4										

PROJECT NO. _____

BORING LOCATION



Project: Swmu 42
SWMU No. PHASE II RFI TEAD-N
Date Drilled: 11-8-93 Date Completed: 11-8-93
Logged By: BRIAN HAMES
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 92
Diameter (in.): 9"
Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

~~Monitoring Well~~ Boring No.: SB-42-017
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: LAYNE
Drilling Method: PERCUSSION HAMMER

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)
0	TR	10	30	0	3	SS	45/6	SM	SILTY SAND; DARK YELLOWISH BROWN (10YR 4/4); FINE SAND; ANGULAR; TRACE PEBBLE GRAVEL TO 4 MM IN DIA; LOOSE; DRY TO MOIST. TOP 2" IS WHITE (10YR 8/1); DENSE.
					4				
1					3				
					3				
2									
3									
4									

ELEVATION (FEET)

sample interval

PROJECT NO. 2942.0170

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

TEAD-N PHASE II RFI
SOIL BORING LOG

MONTGOMERY WATSON

PAGE 1 OF 11 BDH 10

Project: SWMU 42

JMM Boring No.: SB-42-017

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5	40	40	20	0	30	SS	30%	GM	SANDY, SILTY, GRAVEL; DARK YELLOWISH BROWN (10YR 3/4); FINE TO COARSE SAND, GRAVEL TO 40 mm IN DIA., ANGULAR TO SUBROUNDED; LOOSE; DRY.	
					38					
6					50 FOR 2"					
7										
8										
9										
10	50	50		0	27	SS	30%	GW	SANDY GRAVEL; PALE BROWN (10YR 6/3); VERY FINE TO COARSE SAND, GRAVEL TO 25 mm IN DIA., ANGULAR TO SUBROUNDED; LOOSE; DRY.	
					50 FOR 5"					
11										
12										
13										
14										

Sample interval

PROJECT NO. _____

Project: SWMU 42
JMM Boring No.: SB-42-017

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FT)
15				0	46	SS	25%	GW	AS ABOVE	
					50 FOR 5"					
16										
17										
18										
19										
20				0	12	SS	40%	GW	AS ABOVE	
					35					
21					26					
					50 FOR 3"					
22										
23										
24										

PROJECT NO. _____

Project: SWMU 42
JMM Boring No.: SB-42-017

DEPTH (FEET)	GRAIN SIZE: % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
25				0	8	SS	60%	GW	AS ABOVE.	
					24					
26					38					
					31					
27										
28										
29										
30										
		10	90	0	20	SS	80%	CL	SANDY CLAY; GRAY (10YR6/1); COARSE SAND; SUBROUNDED; MEDIUM PLASTICITY; SOFT; MOIST.	
					38			GW	AS PREVIOUS	
31					44					
					45					
32										
33										
34										

PROJECT NO. _____

Project: Swmm 42

JMM Boring No.: SB-42-07

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)
35		40	60	0	3	SS	100%	CL	SANDY CLAY; GRAY (2.5Y 6/1); FINE SAND; SUBANGULAR; MEDIUM PLASTICITY; SOFT; MOIST TO WET.
					5				
36					5				
					9				
37									
38									
39									
40				0	5	SS	100%	CL	AS ABOVE
					9				
41					9				
					8				
42									
43									
44									

PROJECT NO. _____

Project: SWMU 47
JMM Boring No.: SB-42-017

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
45				0	4	SS	100%	CL	AS ABOVE	
					4				"	
46					4					
					5					
47										
48										
49										
50		25	75	0	7	SS	100%	CL	SANDY CLAY; BROWN (10YR 5/3); FINE SAND; SLIGHT GLOSS; MEDIUM PLASTICITY; SOFT; MOIST.	
					9					
51					12					
					14					
52										
53										
54										

PROJECT NO. _____

Project: SW mn 42

JMM Boring No.: SB-42-017

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
5 5				0	8	SS	100%	CL	AS ABOVE
5 6					6				
					10				
5 7					9				
5 8									
5 9									
6 0		20	80	0	5	SS	100%	CL	SANDY ~~SILTY~~ CLAY; BROWN (10YR 5/3); VERY FINE SAND, ANGULAR; MEDIUM PLASTICITY; MEDIUM STIFF; MOIST. (BDH)
6 1					5				
					11				
6 2					21				
6 3									
6 4									

PROJECT NO. _____

Project: Swann 42

JMM Boring No.: SB-42-017

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5				0	6	SS	100%	CL	AS ABOVE	
					6					
6					5					
					8					
7										
8										
9										
10				0	3	SS	100%	CL	AS ABOVE EXCEPT LIGHT GRAY (10YR 7/1)	
	100				4			SP	SAND; LIGHT GRAY (10YR 7/1); VERY FINE GRAINED; ANGULAR TO SUBROUNDED; LOOSE; DRY; VERY WELL	
11					28				SORTED.	
					33					
12										
13										
14										

PROJECT NO. _____

Project: SWMH 42

JMM Boring No.: 58-42-017

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)
75	65		35	0	8	SS	30%	GC	CLAYEY, GRAVEL; LIGHT GRAY (10YR 7/2); GRAVEL FROM 15 TO 60 mm IN DIA., SUBANGULAR TO SUBROUNDED; MEDIUM PLASTICITY, MEDIUM STIFF; MOIST.
					4				
76					7				
					9 for 5"				
77									
78									
79									
80					4	SS	0%	—	NO RECOVERY — ROCK IN SAMPLER
					50 for 2"				
81									
82									
83									
84									

PROJECT NO. _____

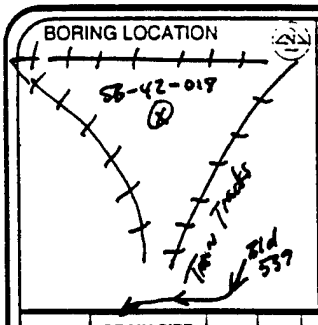
Project: SWMU 42
JMM Boring No.: SB-42-017

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
85	60	40		0	8	SS	35/0	GW	SANDY GRAVEL; LIGHT BROWNISH GRAY (10YR 6/2); FINE TO COARSE SAND, ANGULAR TO SUBANGULAR, GRAVEL TO 50 mm IN DIA.; SUBROUNDED; LOOSE; DRY.	
86					13					
					22					
					31					
87										
88										
89										
90	60		40	0	6	SS	5/0	GC	CLAYEY GRAVEL; DARK YELLOWISH BROWN (10YR 4/4); GRAVEL FROM 10 mm TO 35 mm IN DIA.; SUBROUNDED, MEDIUM PLASTICITY; SOFT; MOIST.	
					50 FOR 3"					
91										
92									T.D. HOLE @ 92'. SAMPLE TO 92'. DRILLING EXTREMELY HARD, NOT WORTH "POUNDING" TO 100' FOR SUCH POOR SAMPLE RECOVERY.	
93										
94										

PROJECT NO. _____

SB-42-018

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 42 SB-42-018
Date Drilled: 10-12-95 Date Completed: 10-12-95
Logged By: BKH
Water Elevation (ft.): NA
Date Measured: NA
Total Depth (ft.): 10
Diameter (in.): 2.5"

Monitoring Well No.: NA
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface 53½ from 42-4
Datum: NGVD (1929) 36½" from 42-2, 1050'
Drilling Contractor: OVERLAND DRILLING CO
Drilling Method: CME 750 HSA

Well Screen: Diameter NA Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

Sample at 15:27 SP183

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color: size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	5	65	30	0	5			SM	SILTY SAND; 10YR 3/3 – dk brown; low plasticity; loose ~~to dense~~; dry; sand very fine, subrounded. Gravel fine to coarse, sub round.	
					11					
1					110				A.A. DENSE	
	40	40	20	0	70		NR	SM	SILTY SAND w/ GRAVEL; 10YR 5/3 – BROWN; NON PLASTIC; ~~DENSE TO~~ VERY DENSE; DRY; SAND – VERY FINE TO MEDIUM; SUB-ROUNDED; GRAVEL – FINE TO COARSE, SUB-ANGULAR.	
2					61					
					110				A.A.	
3					125				A.A.	
	30	45	25	0	24			SM	SILTY SAND w/GRAVEL/10 YR 6/3 – PALE BROWN; NON PLASTIC; DENSE; SAND VI FINE TO FINE, SUB ROUND. GRAVEL – FINE, SUB-ANGULAR.	
4					75					
					67					

Sample at 16:00 SP183

PROJECT NO. 2942.0170

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

Project: LEAD N PHASE II RFI

JMM Boring No.: SB-42-018

DEPTH (FEET)	GRAIN SIZE: % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component; plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5	25	60	15	0	27			SM	SILTY SAND W/ GRAVEL; 10YR 6/3 - PALE BR.; NON PLASTIC; DENSE TO V. DENSE; DRY; SAND U. FINE TO FINE, SUB ROUND; GRAVEL - FINE, SUB ROUND TO ROUND.	
					69					
6					70					
					74					
7	30	55	15	0	23				A.A.	
					41					
8					55					
					53					
9	30	55	15		19				A.A.	
					29					
10							TD=10'			
1										
2										
3										
4										

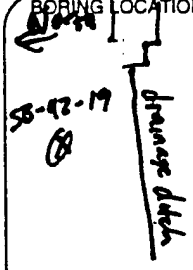
Sample 16:17

Sample @ 16:35

PROJECT NO. _____

SB-42-019

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 42
Date Drilled: 10-12-93 Date Completed: 10-12-93
Logged By: BKH
Water Elevation (ft.): —
Date Measured: —
Total Depth (ft.): 10'
Diameter (in.): 2"

Monitoring Well No.: N/A
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929) 68' @ 34° from 42-4
Drilling Contractor: Overland Drilling
Drilling Method: CME 750 HSA

Well Screen: Diameter N/A Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	45	35	20	0	6	C		SM	Silty sand w/ gravel; 10YR 3/3 - dk brown; no to low plasticity; loose; dry; sand v. fine, sub angular; gravel - fine, sub angular.	
					33				SP poorly graded sand; 10YR 5/3 - brown; no plasticity; dense; dry; sand v. fine, sub angular to sub round.	
1	5	75 80 80	20 80		54	C		SP	Poorly graded sand A.A. poor recovery	
					70		NA			
2	35	45	20		44	C		SM	Silty sand w/ gravel; 10YR 5/3 brown; NO PLASTICITY; V. DENSE; DRY; SAND WELL GRADED V. FINE TO COARSE; sub angular to sub-round; Gravel fine to coarse; SUB-ANGULAR.	
					57					
3					77				A.A.	
					100					
4	35	45	20		96		NA		A.A.	
					100					

Sample AS 12:47

Sample B 13:05

PROJECT NO. 2942.0170

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

Project: TEAD N PHASE II RFI

JMM Boring No.: SB-42-019

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FT)
5	40	45	15		77		NR	SM	Silty sand w/ gravel; 10YR 5/3 - brown; NO PLASTICITY; V. DENSE; DRY; SAND V. FINE to FINE; sub-angular; Gravel - fine to medium COARSE; SUB ANGULAR.	
					61					
6					77					
					81					
7	35	50	15		48				Silty sand w/ gravel; 10YR 5/3 - br.; NON PLASTIC; V. DENSE; DRY; sand V. fine to fine; sub-round; Gravel fine to coarse, sub-angular.	
					51					
8					70					
					70					
9					41				A.A.	
					64					
10							TD=10'			
1										
2										
3										
4										

Sample C 14:45

- Sample D 14:26

PROJECT NO. ____

SB-42-020

BORING LOCATION SB-42-020

Project: TEAD-N PH. II RFI
SWMU No. 42
Date Drilled: 10-13 Date Completed: 10-13-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 10'
Diameter (in.): 2.5"I
Monitoring Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 15'E 135° from 42-1
Drilling Contractor: Dorland Drilling
Drilling Method: CME 750 HSA
Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	25	50	25	0	7			SM	Silty Sand w/ gravel; 10YR 3/3 - dk brown; low plasticity; loose to medium dense; slightly moist to moist; Sand v fine to coarse, Gravel fine to coarse, subang-subang	
1					14					
					17					
					44					
2	40	45	15	0	28			SM	A.A. slightly moist;	
					49					
3					58					
					59					
4	30	55	15		48			SM	silty sand w/ gravel; 10YR 6/3 - pale brown; non plastic; v. dense; dry to slightly moist; Sand v. fine to coarse, sub angular. Gravel fine to coarse, sub angular. Gravel is Limestone.	
					64					

Sample A 0920

Sample B 0920

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PROJECT NO. 2942.0170

Project: TEXACO PHASE RFI

JMM Boring No.: SB-42-020

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5	10	45	15	0	26			SM	Silty sand w/ gravel, 10YR 6/3 - Pale brown; non plastic; med. dense; dry; sand v. fine to fine; sub angular to sub round. Gravel fine to coarse, sub angular.	
					42					
6					51					
					59					
7	35	50	15	0	20		1	SM	A.A.	
					28		1			
8					44					
					63					
9	25	60	15		21			SM	Silty sand w/ gravel 10YR 6/3 - Pale brown, non plastic, med. dense; dry; sand v. fine to fine; sub angular. Gravel fine to coarse, sub round to sub angular.	
					51					
0							TD=10'			
1										
2										
3										
4										

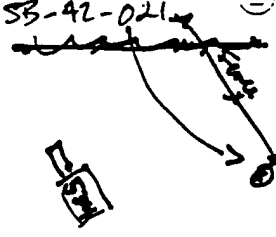
Sample ID: SB-42-(5-7)

Sample ID: SB-42-(9-10)

PROJECT NO. _____

SB-42-021

BORING LOCATION
SB-42-021



Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-13 Date Completed: 10-13-93
Logged By: BKH
Water Elevation (ft.): N/A
Date Measured:
Total Depth (ft.): 40'
Diameter (in.): 2.5"

Monitoring Well No.: N/A
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 180' @ 112° from 42-1
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 HSA

Well Screen: Diameter N/A Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	20	55	25	0	6			SM	SILTY SAND w/ GRAVEL; 10YR 3/3 - dk brown; ~~fine~~ NO TO LOW PLASTICITY; moist; sand v. fine to ~~coarse~~ fine, sub round; Gravel - fine to coarse, sub round to sub angular.	
					16					
1					19					
					32					
2					34			SM	silty sand w/ gravel 10YR 4/3 - pale brown; NON PLASTIC, ~~dry to slightly moist; loose~~ medium dense to dense; dry, Sand v. fine to medium, sub-angular. Gravel - Fine to coarse sub angular.	
					48					
3					48					
					50					
4	40	55	15	0	29				A A	
					38					

Sample @ 11 4.0

Collect DUP @ 13 Sample @ 11.5'

PROJECT NO. 2942.0170

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

Project: TCATO N PHASE II RFI

JMM Boring No.: SB-12-021

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component; or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5	40	45	15	0	14			SM	Silty Sand, brown, fine to medium dense, dry Sand - v. fine to medium, sub-angular Gravel fine, sub-round	
					27					
6					27					
					24					
7	40	50	10	0	16			SM	A.A	
					27					
8					29					
					31					
9	30	60	10	0	17				A.A.	
					48					
10									TD = 10'	
1										
2										
3										
4										

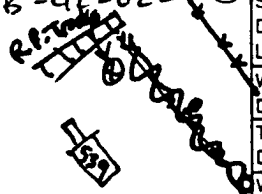
Sample C 12:10

Sample D

PROJECT NO. _____

SB-42-022

BORING LOCATION
SB-42-022



Project: TEAD N PHASE II RFI
SWMU No. 42
Date Drilled: 10-13 Date Completed: 10-13-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 10'
Diameter (in.): 2.5"

Monitonng Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measunng Point is Ground Surface
Datum: NGVD (1929) 110' @ 276° From 42-1
Drilling Contractor: Overland Drilling
Drilling Method: CME 750 HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	15	60	25	0	4	C		SM	Silty sand w/ gravel; 10YR 4/3 - brown to dk brown; low plasticity; soft; moist; sand - fine, sub round. Gravel - fine to coarse, sub-round.	
					7					
1					10					
					16					
2	25	60	15		22	C		SM	Silty, sand w/ gravel 10YR 5/3 - brown; no plasticity; medium dense; slightly moist; sand - v. fine to fine; sub angular. Gravel - fine to coarse, sub-round to sub-angular	
					100					
3	30	60	10	0	55	C			A-A Gravel - fine, sub round	
					56					
4					98					
					130					

Sample A

Sample B

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

Project: TEADN PHASE II RFI

JMM Boring No.: SB-42-022

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAI	LITHOLOGIC DESCRIPTION (USC name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5							NR			
							NR			
6	60	~~35~~ 30	~~5~~ 10	0	27	C	1	SM	well graded gravel; 10YR 5/3 - brown; NO plasticity; dense; slightly moist; gravel fine to coarse; sub round to round	
					31		1			
7					44		1			
					47		1			
8	~~15~~ 17	~~45~~ 35	~~19~~ 15	0	14		1	SW SM	well graded sand w/ silt to gravel; 10YR 6/3 - pale brown; NO plasticity; slightly moist to dry; Sand v. fine to medium; ~~gravel fine to coarse~~ sub round to sub angular. Gravel - fine to coarse, sub round to sub-angular.	
					45		1			
9					49		1			
					45		1			
10							TD = 10'			
1										
2										
3										
4										

PROJECT NO. _____

SB-42-023

BORING LOCATION

SB-42-023

Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-14 Date Completed: 10-14-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 10'
Diameter (in.): 2.5"

Monitoring Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 240' @ 221° from 42-2
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	15	60	25	0.0	3				silty sand w/ gravel; 10YR 4/3 - dk brown; no to low plasticity; soft to medium dense; slightly moist; sand v. fine to fine, sub angular. Gravel fine to coarse, sub-angular.	
					11					
1					24					
					23					
2				0.0	3				A.A.	
					11					
					17					
3					23					
					26					
4	40	45 60	15 10	0.0	54				silty sand w/ gravel; 10 YR 6/3 - pale brown; NO PLASTICITY; v. dense; dry to slightly moist; SAND - FINE to COARSE, sub angular to angular. Gravel FINE to COARSE, sub angular to angular.	
					100					

Sample 4 @ 1'

Sample 6 @ 3'

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

Project: LEADN ZINC II RFI

JMM Boring No.: SB-42-025

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5					100		NR		well graded sand w/ gravel;	
	35	60	5	0.0	66			SW	~~Silty sand w/ gravel~~; 10YR 5/3 - brown; no plasticity; V. DENSE; slightly moist; Sand - V. fine to medium, sub-angular to sub-round. Gravel - fine to coarse, sub-round.	
6					96					
					88					
7	40	50	10	0.0	21			SW	A.A.	
					53					
8					86					
					64				well graded sand w/ silt + gravel;	
9	20	70	10		22			SW-SM	~~Silty sand w/ gravel~~; 10YR 5/3 - brown; no plasticity; MEDIUM DENSE TO DENSE; slightly moist to dry; Sand fine to coarse, sub-angular. Gravel - fine, sub-round.	
					45					
10			TD = 10'							
1										
2										
3										
4										

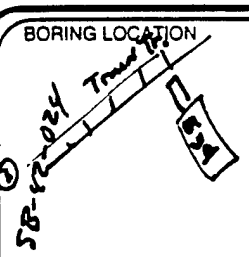
Sample C 12:15

Sample D 10:55

PROJECT NO. _____

SB-42-024

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 42
Date Drilled: 10-14 Date Completed: 10-14-98
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 10'
Diameter (in.): 2.5"

Monitoring Well No.: NA
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929) 212° from 42-2) 190° from 42-4
~900' from 42-
~20' west of RR Trk
Drilling Contractor: Overland Drilling
Drilling Method: CME 750 HSA

Well Screen: Diameter NA Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	10	70	20	0.0	21			SM	Silty sand w/ gravel; 10YR 4/3 - brown to dk brown; no to low plasticity; loose; dry; sand v. fine to fine, subround to sub-angular. Gravel - fine to coarse, subangular.	
					16					
1					16					
					11					
2	10	70	20	0.0	5			SM	A.A.	
					8					
3					93					
					45					
4	25	50	25	0.0	38			SM	Silty sand w/ gravel; 10YR 6/3 - pale brown; NO TO LOW PLASTICITY; DENSE TO VERY DENSE; DRY; sand v. fine, sub-angular. Gravel - coarse, sub-angular.	
					86					

Sample A 11:18

Sample B 11:40

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PROJECT NO. 2942.0170

Project: TEXD-N PHASE II RFI

JMM Boring No.: SB-[illegible]-024

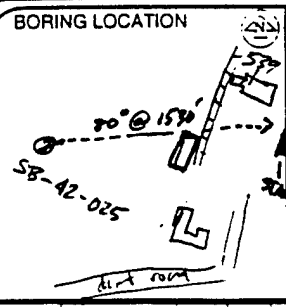
DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
5	40	45	15	0.0	42			SM	Silty sand w/ gravel; 10YR 6/3 - pale brown; NO PLASTICITY; V. DENSE; DRY; sand - very fine to fine, sub-angular.	
					48				Gravel - Fine to coarse, sub-rounded.	
6					56					
					58					
7	30	55	15		23			SM	Silty sand w/ gravel; 10YR 6/3 - pale brown; NO PLASTICITY; DENSE TO V. DENSE; DRY; sand is fine to medium, well-graded sub angular.	
					91				Gravel - Fine to coarse, sub round to sub-ang.	
8					100					
	25	60	15		45			SM	A.A.	
9					48					
					54					
0				TD = 10'						
1										
2										
3										
4										

Backfilled 12:30

PROJECT NO. _____

SB-42-025

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 42
Date Drilled: 10-14 Date Completed: 10-14-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 10'
Diameter (in.): 2.5"

Monitonng Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measunng Point is Ground Surface
Datum: NGVD (1929) 80' TO STACK @ 158°
Drilling Contractor: Overland Drilling
Drilling Method: CME 750 HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
0	2	58	40	0.0	3	C		ML	Sandy silt; 10YR 3/2 - v. dark grayish brown; non to low plasticity; ~~slightly~~ dry to slightly moist; sand v. fine to fine, sub round. Gravel - fine, sub-round.
					4				
1					4				
					7				
2	15	65	20		38	C		SM	Silty sand w/ gravel; 10YR 4/3 - dk brown; no plasticity; dense to v. dense; dry; sand v. fine to medium; sub angular. Gravel fine to coarse, sub-angular to sub-round.
					58				
3					100				
	25	60	15		71	C			A.A.
4					100		NR		
							NR		

ELEVATION (FEET)

Sample A 14:25

Sample B 14:30

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 2

PROJECT NO. 2942.0170

Project: TEAD N PHASE II RFI

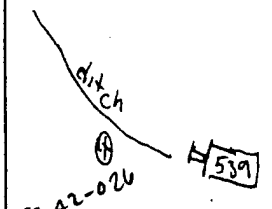
JMM Boring No.: SB-42-025

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5	40	50	10	0.0	46	C	/	SW-SM	Well graded sand w/ silt; 10YR 6/3 - pale brown; NO PLASTICITY; DENSE TO V. DENSE; DRY; Sand v. fine to medium, sub-angular. Gravel - fine, sub-rounded.	
					52		/			
6					70		/			
					71		/			
7	25	65	10	0.0	14	C	/	SW-SM	A. A.	
	40	55	5	0.0	27		/	SW	well graded sand w/ gravel; 10YR 6/3 - pale brown; NO PLASTICITY; loose to medium dense; DRY; sand v. fine to coarse; sub-angular. Gravel - fine to coarse, sub round to sub-angular.	
8					11		/			
					18		/			
9					30		/			
					42		/			
10	TD = 10'									
1										
2										
3										
4										

PROJECT NO. _____

SB-42-026

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-19 Date Completed: 10-19
Logged By: BKH
Water Elevation (ft.): N/A
Date Measured:
Total Depth (ft.): 10'
Diameter (in.): 2.5"
Well Screen: Diameter N/A Depth Slot Size
Casing: Diameter N/A Length Type
Sand Bentonite Seal Cement Grout Seal

Monitoring Well No.: N/A
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 75' @ 162° from 42-4
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 (HSA)

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	5	60	35	0.0	4	C		SM	Silty sand ~~w/ gravel~~; 10YR 3/2 - very dk grayish brown; low plasticity; ~~sand very fine to fine sub rounded~~; loose; moist; sand - very fine to fine sub round; ~~gravel - sparse~~ Sparse gravel fine, sub round	
					4					
1					14					
					100					
2									POORLY GRADED SAND W/ SILT & GRAVEL	
	40	50	10	0.0	34	C		SP-SM	~~silty sand w/ gravel~~; 10YR 5/3 - brown; NO PLASTICITY; DENSE TO V. DENSE; DRY; SAND - V. FINE TO FINE; SUB-ROUND. GRAVEL - FINE TO COARSE, SUB-ROUND TO SUB-ANGULAR.	
					56					
3					58					
					71					
4	40	50	10	0.0	27	C		SP-SM	A.A.	
					61					

Sample SB-42-026A 10:55

SB-42-026B 11:15

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

Project: TEAD N PHASE II RFI

JMM Boring No.: SB-42-026

SB-42-026D 11:55

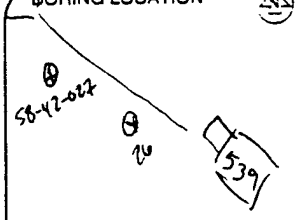
SB-42-026D 12:18

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5	35	55	10	0.0	48	C		SP-SM	A.A.	
					58					
6					56					
					69					
7	40	50	10	0.0	15	C		SP-SM	A.A.	
					25					
8	45	45 to 50	10 to		17			SW SM	well graded ~~sand~~ w/ silt & gravel; 10YR 5/3 - BR; NO PLASTICITY; MEDIUM DENSE TO DENSE; DRY; SAND VERY FINE TO MEDIUM, SUB ANGULAR. GRAVEL - FINE TO COARSE, SUB-ROUND TO SUB ANGULAR.	
					34					
9					31					
					43					
10				TD = 10 FT						
1										
2										
3										
4										

PROJECT NO. _____

SB-42-027

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-19 Date Completed: 10-19-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 10'
Diameter (in.): 2.5"
Well Screen: Diameter ____ Depth ____ Slot Size ____
Casing: Diameter NA Length ____ Type ____
Sand ____ Bentonite Seal ____ Cement Grout Seal ____

Monitoring Well No.: NA
Northing: ____ Easting: ____
Ground Surface Elevation (ft.): ____
Measuring Point is Ground Surface
Datum: NGVD (1929) 90° & 289° from 42-4
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 HSA

Sample @ SB-42-027A 12:50

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	5	~~5~~	~~30~~ 25	0.0	5	C		SM	silty SAND; 10YR 3/3 - dk brown; NO TO LOW PLASTICITY; LOOSE; MOIST; SAND V. FINE TO FINE, SUB ROUND. V GRAVEL - FINE SPARSE SUB-ROUND.	
					7					
1					100					
					21		NR			
2	25	65	10	0.0	52	C		SW-SM	well graded ~~sandy silty~~ SAND w/ SILT and gravel; 10YR 5/3 - BROWN; DENSE TO V. DENSE; DRY; SAND - V. FINE TO MEDIUM, SUB-ANGULAR. GRAVEL - FINE TO COARSE, SUB-ROUND TO SUB ANGULAR.	
					58					
3					73					
					79		NR			
4	20	70	10		48			SW-SM	well graded SAND w/ SILT AND GRAVEL; 10YR 5/3 - BROWN; DENSE TO V. DENSE; DRY; SAND - V. FINE TO COARSE, SUB ANGULAR. GRAVEL - FINE TO COARSE, SUB ROUND TO SUB-ANGULAR	
					51					

SB-42-27 B (20-24) 13:30

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

Project: LEAD N PHASE II RFI

JMM Boring No.: SB-42-027

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5					58				A.A.	
					54					
6				0.0	15	C		SW SM	A.A.	
					29					
7					23					
					22					
8	50	40	10	0.0	14	C		GW GM	well graded gravel w/ silt; 10YR6/3 - pale brown; LOOSE TO MED. DENSE; ~~DAY TO SLIGHTLY MOIST~~; NO PLASTICITY; DRY TO SLIGHTLY MOIST; SAND V. FINE TO COARSE, SUB ROUND. GRAVEL- FINE TO COARSE, SUB-ROUND.	
					35					
9					45					
					46					
10					TD = 10'					
1										
2										
3										
4										

SB-42-27C 13:49

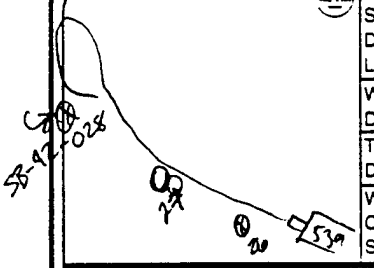
SB-42-DP222 @13:52

SB-42-27D 13:52

PROJECT NO. _____

SB-42-028

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 42
Date Drilled: 10-19 Date Completed: 10-19-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 10'
Diameter (in.): 7.5"

Monitoring Well No.: N/A
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 90° & 190° from 42-5
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 (HSA)

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	0	80	20	0.0	2	C		SM	SILTY SAND; 10YR 4/3 - BR TO DARK BROWN; NO PLASTICITY; LOOSE; DRY TO SLIGHTLY MOIST; SAND V. FINE TO FINE, SUB-ROUND.	
					3					
1					25					
	40	50	10	0.0	39	C		SW-SM	well graded SAND w/ SILT & GRAVEL; 10YR 5/3 - BROWN; NO PLASTICITY; DENSE; DRY; SAND V. FINE TO COARSE, SUB-ANGULAR. GRAVEL - FINE TO COARSE, SUB-ROUND.	
2					68					
					100					
3							NR			
							NR			
4							NR			
							NR			

SAMPLE #1

SAMPLE #2

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

TEAD-N PHASE II RFI
SOIL BORING LOG

MONTGOMERY WATSON

PROJECT NO. 2942.0170

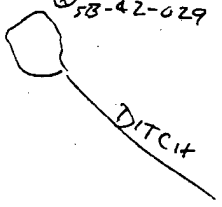
Project: LEAD N PHASE II RFI
JMM Boring No.: SB-42-028

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
5	40	50	10	0.0	28	C		SW-SM	well graded sand w/ silt & gravel. 4.A.	
					67					
6					57					
					55					
7					100		NR			
					100		NR			
8	45	50	5		21			SW	well graded SAND w/ gravel; 10YR 6/3 - PALE BROWN; NO PLASTICITY; V. DENSE; DRY; SAND V. FINE TO COARSE; SUB-ROUND TO SUB-ANGULAR.	
					63				GRAVEL FINE TO COBBLES; SUB ROUND TO SUB-ANGULAR.	
9					107					
					78					
10				TD=10'						
1										
2										
3										
4										

PROJECT NO.

SB-42-029

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 42
Date Drilled: 10-9 Date Completed: 10-19-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 10'
Diameter (in.): 2.5"

Monitoring Well No.: NA
Northing: NA Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 80' @ 5° from 42-5
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 (HSA)

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

SB-42-029A 16:45

SB-42-029B 16:59

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	0	75	25	0.0	1	C		SM	SILTY SAND; 10YR 3/3 - dk BROWN; LOW PLASTICITY; LOOSE; SLIGHTLY MOIST TO MOIST; SAND V. FINE, SUB ROUND. CONTAINS ROOTLETS, VEGETATION	
					3					
1					7					
2	3	72	20	0.0	5	C		SM	SILTY SAND; 10YR 4/3 - BROWN TO DK BROWN; LOW PLASTICITY TO NONE; ~~DRY~~, LOOSE; DRY; SAND - V. FINE TO FINE, SUB - ROUND. GRAVEL - FINE, SUB - ROUND.	
					9					
					13					
3					17					
4	25	65	10		17			SW-SM	well graded sand w/ silt and gravel; 10YR 5/3 - BROWN; NO PLASTICITY; ~~LOOSE TO~~ MEDIUM DENSE; DRY; SAND V. FINE TO COARSE, SUB ANGULAR. GRAVEL - FINE TO COARSE, SUB ROUND TO SUB ANGULAR	
					22					
					11					

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB-42-029C
1 of 2

Project: TEAD N PHASE II RFI

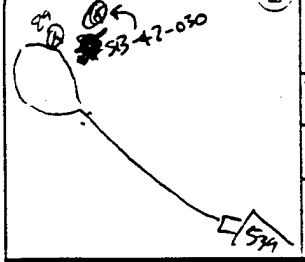
JMM Boring No.: SB-42-029

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color, size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5					24				A.A.	
					29					
6					23					
					22					
7	55	45	10		7			GW-GM	WELL GRADED GRAVEL W/ SILT; 10YR 6/3 - PALE BROWN; ~~LOOSE~~; NO PLASTICITY; LOOSE; DRY; SAND - V. FINE TO COARSE; SUB-ANGULAR.	
					9				GRAVEL FINE TO COARSE; SUB-ROUND TO SUB-ANGULAR.	
8					9					
					11					
9					14					
					17					
0				TD = 10 FT						
1										
2										
3										
4										

PROJECT NO. _____

SB-42-030

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-20 Date Completed: 10-20-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 5'
Diameter (in.): 2.5"
Monitoring Well No.: N/A
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 214° TO 42-5 @ 230 FT
Drilling Contractor: DIVERSIFIED DRILLING
Drilling Method: CME 750 HSA
Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)
0	5	75	20	0.0	8	C		SM	SILTY SAND W/ GRAVEL; 10YR 4/3 - DK BROWN; NO TO LOW PLASTICITY; LOOSE; SLIGHTLY MOIST; SAND V. FINE TO FINE, SUB ROUND. GRAVEL - FINE TO COARSE; SUB ROUND.
					16				
1					95				
					100				
2	15	75	10	0.0	45	C		SM	A.A.
					59				
3	25	65	10	0.0	65	C		SW-SM	WELL GRADED SAND W/ SILT AND GRAVEL; 10YR 5/3 - BROWN; NO PLASTICITY; V. DENSE; DRY; SAND - V. FINE TO ~~MEDIUM~~ COARSE; SUB-ANGULAR TO SUB ROUND. GRAVEL - FINE TO COARSE; SUB ROUND.
					71				
4					81				
					100				

ELEVATION (FEET)

SB-42-0304 0933 1

SB-42-0308 0950 1

TD = 5'

PROJECT NO. 2942.0170

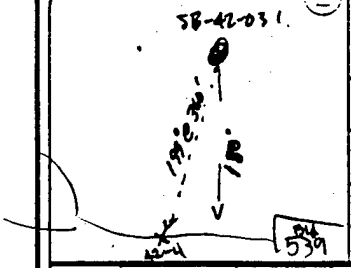
*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB-42-031

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 42
Date Drilled: 10-20 Date Completed: 10-20-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 5 FT
Diameter (in.): 25"

~~Monitoring Well~~ No.:
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 199° TO 42-1 @ 360'
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 75D - HSA

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	12	68	30	0.0	4	C		SM	SILTY SAND; 10YR 2/2 - V. dk brown; NO TO LOW PLASTICITY; LOOSE; SL. MOIST TO MOIST.; SAND - V. FINE TO FINE, SUB-ROUND TO SUB-ANG. SPARCE GRAVEL - FINE TO COBBLES, SUB-ROUND	
					14				CONTAINS ROOTLETS.	
1					63					
					100		NR			
2	30	60	10	0.0	41	C		SW-SM	well graded SAND w/ SILT AND GRAVEL; 10YR 6/3 - PALE BR NO PLASTICITY; V. DENSE; DRY. SAND - V. FINE TO MEDIUM, SUB-ROUND TO SUB-ANGULAR. GRAVEL - FINE TO COARSE, SUB-ROUND.	
					48					
3	35	55	10		79					
					100					
4	45	45	10		90			SW-SM	A.A.	
					100					

TD=5'

- *C California Split Spoon Sampler (2.5" I.D.)
- S Standard penetration test sampler
- c Cuttings
- ▼ Elevation of ground water

MONTGOMERY WATSON

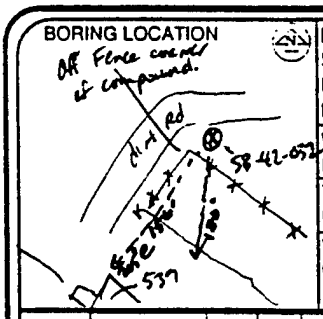
TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

SB-42-032

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-20 Date Completed: 10-20-93
Logged By: BKH
Water Elevation (ft.): —
Date Measured: NA
Total Depth (ft.): 5'
Diameter (in.): 2.5"

Monitoring Well No.: NA
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929) 205' TO 42-20 @ 156'
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 75 HSA

Well Screen: Diameter _____ Depth _____ Slot Size _____
Casing: Diameter NA Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	15	50	35	0.0	5	C		SM	Silty sand w/ gravel; 10YR 3/2 - V. DK GRAYISH BROWN; LOW PLASTICITY; LOOSE; MOIST; SAND - V. FINE TO FINE, SUB ROUND. GRAVEL FINE TO COARSE, SUB ROUND.	
					11					
1					13					
					47					
2	30	60	10	0.0	59	C		SW-SM	WELL GRADED SAND w/ SILT & GRAVEL; 10YR 6/3 - PALE BROWN; NO PLASTICITY; V. DENSE; DRY SAND - V. FINE TO COARSE; SUB ANGULAR TO SUB ROUND; GRAVEL - FINE TO COARSE; SUB ROUND	
					102					
3									A.A.	
4										

SB-42-032A 11:45

SB-42-033 /

TD = 5'

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

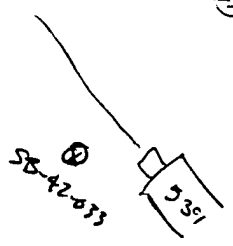
MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

~~SB-42-033~~

SB-42-033

BORING LOCATION



Project: TEAD-N
SWMU No. 42
Date Drilled: 10-20 Date Completed: 10-20-93
Logged By: BKH
Water Elevation (ft.):
Date Measured: NA
Total Depth (ft.): 5'
Diameter (in.): 2.5"

Monitoring Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) +210' TO SB-42 E343
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 (HSA)

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	5	80	15		5			SM	SILTY SAND W/ GRAVEL; 10YR 3/3 - dk brown; NO TO LOW PLASTICITY; LOOSE TO MEDIUM DENSE; ~~MOIST~~ SLIGHTLY MOIST; SAND VFINE TO FINE, SUB-ROUND. GRAVEL - FINE, SUB ROUND.	
					21					
1					22					
					38			SP-SM		
2	15	75	10		16				~~Poorly~~ GRADED SAND W/ SILT & GRAVEL; 10YR 5/3 - BROWN; NO PLASTICITY; MED. DENSE; DRY. SAND - FINE, SUB ROUND. GRAVEL - FINE TO COARSE, SUB ROUND.	
					20					
3					45			SW SM	WELL GRADED SAND W/ SILT & GRAVEL; 10YR 5/3 - BROWN; NO PLASTICITY; DENSE; DRY; SAND - V. FINE TO MEDIUM, SUB ANGULAR ~~TO SUB ROUND~~; GRAVEL - FINE, SUB-RO	
					61					
4					71					
					94					

TD: 5'

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

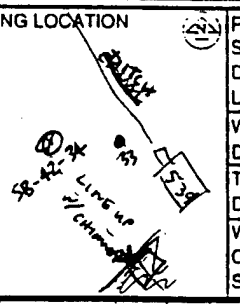
D&P #37
SB-42-033A 13:15
GEOTECH SAMPLE

SB-42-338
1332

SB-42-034

SB-42-034

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 42
Date Drilled: 10-20 Date Completed: 10-20-93
Logged By: BKH
Water Elevation (ft.):
Date Measured: NA
Total Depth (ft.): 5'
Diameter (in.): 25"

Monitoring Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) * 420' @ 235° TO 42-4
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 75D (HSA)

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	5	60	35	0.0	4	C		SM	SILTY SAND; 10YR 3/2 - V. dk grayish brown; LOW PLASTICITY; LOOSE; MOIST; SAND - V. FINE TO FINE, SUB-ROUND. GRAVEL FINE, SUB ROUND. CONTAINS ROOTLETS.	
					11					
1	15	75	10	0.0	31	C		SW-SM	SILTY SAND W/ GRAVEL; 10YR 6/3 - PALE BROWN; NO PLASTICITY; DENSE TO V. DENSE; DRY. SAND - V. FINE TO MEDIUM; SUB-ROUND TO SUB-ANG GRAVEL - FINE TO COARSE, SUB-ROUND.	
					71					
2	45	45/50	10/5	0.0	61	C		SW-SM	A.A.	
					70					
3	45	50/45	5	0.0	100	C		SW	WELL GRADED SAND W/ GRAVEL; 10YR 6/3 - PALE BROWN; NO PLASTICITY; V. DENSE; DRY; SAND - VERY FINE TO COARSE; SUB-ROUND TO SUB-ANGULAR. GRAVEL - FINE TO COARSE	
					100					
4									A.A.	
							NA			

SB-42-0344

SB-42-345

TD=5'

PROJECT NO. 2942.0170

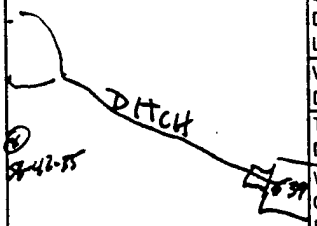
* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB-42-035

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-24 Date Completed: 10-24-95
Logged By: BKH
Water Elevation (ft.):
Date Measured: NA
Total Depth (ft.): 5'
Diameter (in.): 2.5"

Monitoring Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 80° TO 42-2, 47° TO 4
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 (HSA)

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0		70	30	0.0	3	C	1	SM	silty sand, 10YR 3/3 - dk brown; low plasticity; loose; moist. Sand is fine to fine, sub round.	
					14		1			
1					71					
					97					
2		40	55	5	0.0	100	C	NR	SW	well graded sand w/ gravel; 10YR 5/3 - BR... NO PLASTICITY; V. DENSE, DRY ~~TO SLIGHTLY MOIST~~ SAND FINE TO MEDIUM; SUB ANG. TO SUB ROUND. GRAVEL FINE TO COBBLES, SUB-ANGULAR, ~~SUB-ROUND~~ TO SUB ROUND.
					100		NR		~~POOR RECOVERY~~ SB	
3		50/45	95	5	0.0	91			A.A. Poor recovery Cobbles to 2' diameter, rounded.	
					120		NR			
4					136		NR		~~POOR RECOVERY~~ SB	
							NR		REFUSAL	

SB-42-35A
SB-42-35B

TD = 5'

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

SB-42-636

BORING LOCATION
SB-42-034

Project: TEAD N PHASE II RFI
SWMU No. 42
Date Drilled: 10-21 Date Completed: 10-21-93
Logged By: BLH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 5'
Diameter (in.): 2.5"
Monitoring Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 330 FT TO SB-42-018 @ 333'
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 75D (HSA)
Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	0	80	20	0.0	4	C		SM	SILTY SAND; 10YR 3/3 - dk BROWN; NO PLASTICITY; LOOSE; SLIGHTLY MOIST; SAND V. FINE TO FINE SUB-ROUND. Continues to cuttings	
					5					
1					17					
					79					
2	40	50/0		0.0	57/6	C		SW-SM	well graded sand w/ silt & gravel; ~~no~~ 10YR 6/3 - PALE BR; ~~V. DENSE~~ NO PLASTICITY; V. DENSE; DRY; SAND V. FINE TO MEDIUM; ~~SUB~~ SUB angular; Gravel - FINE TO COARSE, SUB-ROUND.	
					100					
3					~~HIT REFUSAL~~				VERY GRAVELLY, LARGE COBBLES, ~~HIT REFUSAL~~	
					130		NR			
					130		NR			
4	55	40	5		94			GW	well graded gravel w/ SAND; 10YR 6/3 - PALE BROWN; NO PLASTICITY; V. DENSE; DRY TO SLIGHTLY MOIST; ~~SAND V. FINE TO MEDIUM~~ Gravel FINE TO COBBLES SUB ROUND TO SUB ANGULAR. SAND. V. FINE TO MED, SUB-ANGULAR	
					130					

SB-42-364 / SB-42-368 / 0161

TD=5'

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

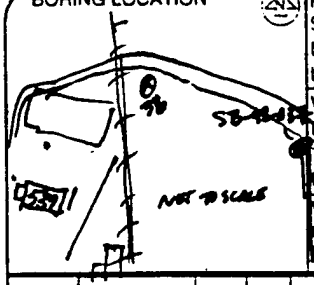
MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB-42-037

SB-42-037

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-21 Date Completed: 10-21-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 5'
Diameter (in.): 2.5"

Monitoring Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) ~~3960~~ 960' @ 335° TO SB-
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 HSA

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	0	80	20	0.0	2	C		SM	SILTY SAND; 10YR 4/3 - BROWN TO DK BROWN, NO ~~TO LOW~~ PLASTICITY; LOOSE; SLIGHTLY ~~MOIST~~; SAND VI. FINE TO FINE, SUB ROUND.	
					2					
1					11					
		65	35		12			SC	CLAYEY SAND; 10YR 6/3 - PALE BROWN; LOW ~~PLAS~~ TO MEDIUM PLASTICITY; MEDIUM STIFF; DRY; SAND VI. FINE, SUB-ROUND.	
2	0	75	25	0.0	2 ~~2~~	C		SM	SILTY SAND; 10YR 6/3 - PALE BROWN; NO TO LOW PLASTICITY; LOOSE; DRY; SAND VI. FINE SUB ROUND.	
					10 ~~10~~					
3	50	45 ~~50~~	5 ~~50~~		32 ~~32~~	C		GW	well graded gravel w/ SAND; 10YR 6/3 - PALE BROWN; NO PLASTICITY; DENSE; DRY. SAND FINE TO ~~MEDIUM~~ COARSE, SUB ANG. GRAVEL - FINE TO COARSE, SUB-ROUND.	
					34 ~~34~~					
4					27					
					24					

TD = 5'

SB-42-37A
SB-42-D2945
GEOTECH SAMPLES
13:25

SB-42-37B
13:32

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

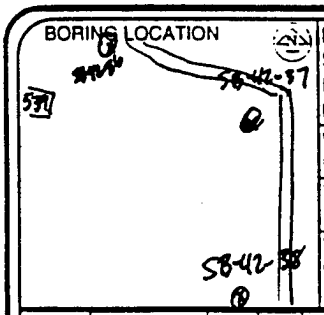
PROJECT NO. 2942.0170

PAGE 1 OF 1

SB-42-038

SB-42-038

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 42
Date Drilled: 10-21 Date Completed: 10-21-93
Logged By: BKH
Water Elevation (ft.):
Date Measured: NA
Total Depth (ft.): 5
Diameter (in.): 2.5"

Monitoring Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 355° @ 1140 FT TO SB-42-36
Drilling Contractor: BVEHLAND DRILLING
Drilling Method: CME 750 (HSA)

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0		75	25	0.0	2	C		SM	SILTY SAND; 10YR 4/3 - BROWN TO DK BROWN; NO TO LOW PLASTICITY; ~~SL MOIST~~; LOOSE; SL. MOIST; SAND V. FINE TO FINE SUB ROUND.	
					4					
1					5					
	2	75	23		15				SILTY SAND; ~~FINE~~ 10YR 6/3 - PALE BROWN; NO PLASTICITY; ~~DENSE~~ MED. DENSE; DRY. SAND - V. FINE TO FINE; SUB ROUND TO SUB-ANGULAR.	
2	0	35	65		7			CL	LEAN CLAY W/ SAND; 10 YR 6/3 PALE BROWN; MEDIUM PLASTICITY; ~~FIRM~~ SOFT TO MED. STIFF; DRY; SAND V. FINE, SUB ROUND.	
					10					
3		45			44			GW	SILT AND well graded gravel w/ SAND; 10YR 6/3 - PALE BROWN; NO TO LOW PLASTICITY; V. DENSE; DRY. SAND - FINE ~~TO MEDIUM~~ SUB ROUND. GRAVEL - FINE TO COARSE, SUB-ROUND. GRAVEL IS LIMESTONE AND QTZ	
		45			130			GM		
4					120				HIT REFUSAL - VERY GRAVELLY & COBBLEY	
					130			NR		

TD = 5 FT

SB-42-038A

SB-42-038B

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

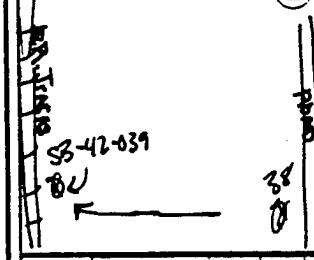
MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

SB-42-039

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-21 Date Completed: 10-21-95
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 5'
Diameter (in.): 2.5"
Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

Monitoring Well No.: A
Northing: NA Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 335° @ 980' to 42-1
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 HSA

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	5	70	25	0.0	8	C		SM	SILTY SAND; 10YR 3/3 - dk BROWN; NO TO LOW PLASTICITY; LOOSE; SL. MOIST; SAND V. FINE TO FINE; SUB-ROUND. SPARSE GRAVEL, FINE, SUB-ROUND. SOME ROOTLETS PRESENT.	
					7					
1					41					
					108					
2	40	50	10	0.0	53	C		SW-SM	well graded SAND w/ SILT AND GRAVEL; 10YR 6/3 PALE BROWN; NO PLASTICITY; V. DENSE; DRY. SAND - FINE TO COARSE, SUB-ANGULAR. GRAVEL - FINE TO COARSE, SUB-ROUND TO SUB-ANGULAR. GRAVEL IS QTZITE + LIMESTONE.	
					130					
3					100/0.5'		NR		REFUSAL	
	30	60	10		35			SW-SM	well graded SAND w/ SILT AND GRAVEL; 10YR 6/3 PALE BROWN; NO PLASTICITY; V. DENSE; DRY. SAND - FINE TO MEDIUM, SUB-ANGULAR. GRAVEL - FINE, SUB-ROUND TO COARSE, SUB-ROUND.	
4					104					
					100					

TD=5'

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

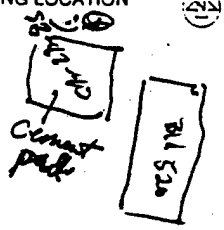
TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

SB-42-040

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-22 Date Completed: 10-22-98
Logged By: BKH
Water Elevation (ft.): —
Date Measured: NA
Total Depth (ft.): 5'
Diameter (in.): 2.5"
Well Screen: Diameter — Depth — Slot Size —
Casing: Diameter NA Length — Type —
Sand — Bentonite Seal — Cement Grout Seal —

Monitoring Well No.: NA
Northing: — Easting: —
Ground Surface Elevation (ft.): —
Measuring Point is Ground Surface
Datum: NGVD (1929) 201' To STACK @ 255 Ft
Drilling Contractor: OVERLAND
Drilling Method: CME 750 - HSA

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	15	65	20	0.0	8	C		SM	SILTY SAND w/ GRAVEL; 10YR 3/2 - VERY dk grayish brown; NO TO LOW PLASTICITY; LOOSE TO MEDIUM DENSE; MOIST; SAND v. fine to FINE, sub round. Gravel FINE, sub round. Fe staining present & metal debris.	
					13					
1					21					
					29					
2	5	75	20		7			SM	SILTY SAND; 10YR 4/3 - BROWN; NO TO LOW PLASTICITY; LOOSE TO MED. DENSE; MOIST; SAND v. FINE TO FINE, SUB ROUND. TR SPARSE gravel present, fine, sub-round.	
					15					
3					65					
					24					
4	60	35	5		34			GP	POORLY graded gravel w/ sand; 10YR 5/3 BROWN; NO PLASTICITY; MED. DENSE TO DENSE; MOIST. Gravel fine, sub-rounded, occ sized. Sand - fine, sub angular to sub round.	
					32					

TD=5'

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

SB-42-041

BORING LOCATION

SB-42-41

SB-42-

Project: TEAD N PHASE II RFI
SWMU No. 42
Date Drilled: 10-22 Date Completed: 10-22-98
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 5'
Diameter (in.): 2.5"

Monitoring Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 340° TO 42-1 @ 75'
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 - HSA

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
0	60	15	25	0.0	10	C		GM	SILTY GRAVEL W/ SAND; 10YR 3/3 - DK BROWN; LOW PLASTICITY FOR FINES; MEDIUM DENSE TO DENSE; MOIST; SAND V. FINE TO FINE, SUB ROUND. GRAVEL FINE TO COARSE, SUB ROUND.
					34				
1					37				
					36				
2	60	35	5	0.0	33	C		GP	POORLY GRADED GRAVEL W/ SAND; 10YR 5/3 - BR; NO PLASTICITY; DENSE TO V. DENSE; SAND FI SLIGHTLY MOIST. SAND - V. FINE TO MEDIUM, SUB-ANGULAR. GRAVEL - FINE, SUB-ROUND.
					72				
3	50	45	5	0.0	80	C		GP	@ A.A.
					91				
4					125				
					120			NA	HIT REBARS - COBBLES - GRAVEL

ELEVATION (FEET)

SB-42-041A

SB-42-041B

TD=5'

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB-42-042

BORING LOCATION

Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-22 Date Completed: 10-22-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 5'
Diameter (in.): 25"

Monitoring Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 18° @ 230' TO 42-1
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 (HSA)

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

SB-42-42

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	35	40	25	0.0	10	C		SM	SILTY SAND W/ GRAVEL; 10YR 3/3 DK BROWN; NO TO LOW PLASTICITY; LOOSE; MOIST; SAND V. FINE TO FINE, SUB ROUND. GRAVEL FINE, SUB-ROUND	
					12					
1					15					
					15					
2	15	65	20	0.0	10	C		SM	A.A. 10YR 4/3 BROWN TO DK BROWN, LESS GRAVEL	
					13					
3	60	35	5	0.0	17	C		GP	POORLY GRADED GRAVEL W/ SAND; 10YR 6/3 PALE BROWN; NO PLASTICITY; DENSE; SLIGHTLY MOIST; GRAVEL - FINE, ROUND 1/4" dia. SAND - V. FINE TO FINE, SUB ROUND TO SUB ANGULAR.	
					40					
4					32					
					38					

SB-42-42A 11:10

SB-42-42B 11:19

TD = 5'

PROJECT NO. 2942.0170

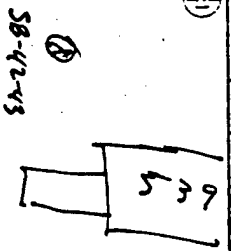
* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB-42-43

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 42
Date Drilled: 10-22 Date Completed: 10-22
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 5'
Diameter (in.): 2.5"

Monitoring Well No. NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 36° TO 42-1 @ 205'
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	15	60	25	0.0	4	C		SM	SILTY SAND W/ GRAVEL; (10YR 3/3 dk brown); LOW TO LOW PLASTICITY; LOOSE; MOIST; SAND V. FINE SUB ROUND. GRAVEL FINE SUB ROUND TO ROUND. TO 2"	
1					7					
					7					
					22					
2	0	65	35		12			SM	SILTY SAND, NO GRAVEL; 10YR 3/3 - dk brown; LOW PLASTICITY; ~~NOT~~ LOOSE ~~TO MED DENSE~~; MOIST; SAND V. FINE TO FINE, SUB ROUND.	
3	60	35	5		54			GW	well graded gravel w/ SAND; 10YR 6/3 - PALE BR; NON PLASTICITY; V. DENSE; DRY TO SL. MOIST; SAND FINE TO MEDIUM, SUB ANGULAR. GRAVEL FINE TO COARSE (2"), SUB ROUND TO SUB ANGULAR.	
					47					
4					53					
					42					
					50					

SB-42-43A @ 1153

SB-42-43B 12:04

TD=5'

PROJECT NO. 2942.0170

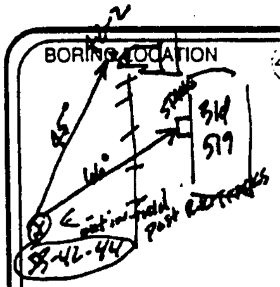
* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB-42-044

BORING LOCATION



Project: TEAD N Phase II RFI
SWMU No. 42
Date Drilled 10-22 Date Completed: 10-22-98
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 5'
Diameter (in.): 2.5"

Monitoring Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 66° TO STACK 45° TO 42-2
Drilling Contractor: OVERLAND DRILLING
Drilling Method:

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	0	75	25	0.0	7	C	/	SM	SILTY SAND; 10YR 3/3 dk BROWN; NO TO LOW PLASTICITY; LOOSE; DRY TO SLIGHTLY MOIST; SAND V. FINE, SUB-ROUND.	
					4		/			
1					42		/			
					87		/			
2	35	55	10		92		/	SW-SM	well graded sand w/ SILT & GRAVEL; 10YR 6/3 - PALE BR; NO PLASTICITY; V. DENSE; DRY. SAND V. FINE TO COARSE, SUB-ROUND TO SUB ANGULAR.	
					100		NR		GRAVEL - FINE TO COARSE, SUB ROUND TO SUB-ANGULAR. GRAVEL = Quartzite + LIMESTONE.	
3	40	50	10				/		A.A.	
4							/			
							NR		GRAVEL/COBBLES, HIT refusal	

TD=5'

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

SB-42-444
SB-42-448

PROJECT NO. 2942.0170

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB-42-45

BORING LOCATION

Project: TEADN PHASE II RFI
SWMU No. 42
Date Drilled: 10-23 Date Completed: 10-23-95
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 5'
Diameter (in.): 25"

Monitoring Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 118', 99' TO 42-1
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 (HSA)

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
0	25	40	35	0.0	21	C		SM	SILTY SAND W/ GRAVEL; 10YR 3/3 - DK BROWN; LOW PLASTICITY; M. DENSE; SLIGHTLY MOIST. SAND V. FINE TO FINE, SUB-ROUND. GRAVEL FINE TO COARSE, SUB-ROUND.
1					21				
					12				
					21				
2	45	50	5	0.0	9	C		SW	well graded sand w/ gravel; 10YR 4/3 BROWN TO DK. BROWN; NO PLASTICITY; DENSE; SL. MOIST; SAND FINE TO COARSE, SUB ANG TO SUB ROUND. GRAVEL FINE TO COARSE, SUB-ROUND TO ROUND.
					31				
3	40	50	10	0.0	36	C		SW-SM	~~STOCKPILE~~ ASPHALT. 10YR 6/3 - PALE BROWN; NO PLAST; DENSE TO VERY DENSE; DRY TO SL. MOIST. SAND FINE TO COARSE SUB ANG TO SUB ROUND. GRAVEL FINE TO COARSE, SUB ANGULAR TO SUB ROUND. WELL GRADED SAND W/ SILT AND GRAVEL;
					56				
4					57				
					60				

ELEVATION (FEET)

SB-42-0454 0848 /

SB-42-0482 0858 /

TD=5'

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB-42-046

BORING LOCATION

Project: LEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-23 Date Completed: 10-23-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 5'
Diameter (in.): 2.5"
Well Screen: Diameter ____ Depth ____ Slot Size ____
Casing: Diameter NA Length ____ Type ____
Sand ____ Bentonite Seal ____ Cement Grout Seal ____

Monitoring Well No.: NA
Northing: ____ Easting: ____
Ground Surface Elevation (ft.): ____
Measuring Point is Ground Surface
Datum: NGVD (1929) 333' TO 42-4 @ 309 FT
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 - HSA

539

SB-42-046

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	25	40	35	0.0	5	C		SM	SILTY SAND W/ GRAVEL; 10YR 3/3 - DK BROWN; LOW PLASTICITY; LOOSE TO MED. DENSE; SL. MOIST; SAND V. FINE TO FINE, SUB ROUND. GRAVEL - FINE TO COARSE, SUB-ROUND.	
					10					
1					15					
					30					
2	45	45	10	0.0	23	C		SW-SM	WELL GRADED SAND W/ SILT AND GRAVEL; 10YR 6/3 - PALE BROWN; NO PLASTICITY; MED. DENSE; SL. MOIST; SAND V. FINE TO COARSE, SUB ROUNDS TO SUB ANGULAR. GRAVEL - FINE TO COARSE, SUB ROUNDS TO ROUND.	
					40					
3	40	45	15	0.0	43	C		SW-SM	A.A.	
					46					
4					60					
					84					

SB-42-044
0930

SB-42-048
0943
+ GEOTECH. SAMPLE

PROJECT NO. 2942.0170

TD=5'

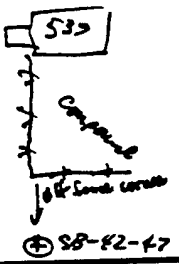
*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB-42-047

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-23 Date Completed: 10-23-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 5'
Diameter (in.): 2.5"
Monitoring Well No.: NA
Northing: NA Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 540 Ft TO EL-4 @ 538'
Drilling Contractor: DIVERSIFIED DRILLING
Drilling Method: CME 750 HSA
Well Screen: Diameter NA Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

SB-42-47A 1048 1

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	15	60	25		8			SM	SILTY SAND W/ GRAVEL; 10YR 3/3 DK BROWN; NO TO LOW PLASTICITY; LOOSE; MOIST TO WET; SAND V. FINE TO FINE, SUB ROUND. GRAVEL, FINE SUB ROUND TO ROUND.	
1					7					
					11					
2	2	68	30		21			SM	SILTY SAND; 10YR 3/3 DK BROWN; LOW PLASTICITY; MED. DENSE; MOIST; SAND V. FINE TO FINE SUB ROUND. TRACE GRAVEL, FINE, SUB-ROUND.	
	60	30	10		16			GW GM	WELL GRADED GRAVEL W/ SAND AND SILT; 10YR 6/3 - PALE BR.; ~~LOOSE TO MED. DENSE~~; NO ~~TO LOW~~ PLASTICITY; LOOSE TO MED. DENSE; MOIST; SAND FINE TO COARSE; SUB-ANGULAR. GRAVEL FINE TO COARSE, SUB-ROUND.	
3					16					
	50	30	20		20			GM	SILTY GRAVEL W/ SAND; 10YR 6/3 PALE BR.; NO TO LOW ~~PLAST~~; MOIST TO WET; SAND V. FINE TO COARSE, SUB-ANGULAR. GRAVEL - FINE TO COARSE, SUB-ROUND	
					34					
4					63				A.A.	
					57					

SB-42-47B 1017

TD=5'

PROJECT NO. 2942.0170

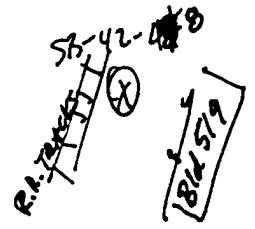
* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB-42-48

BORING LOCATION



Project: TEAD N PHASE II RFI
SWMU No. 42
Date Drilled: 10-22 Date Completed: 10-22-96
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 5'
Diameter (in.): 2.5"

Monitoring Well No.: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 48° TO STACK SURVEY PNT @ 320 Ft
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 HSA

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	30	45	25	0.0	5	C		SM	Silty/sandy gravel; 10YR 3/2 V. dk grayish brown; NO TO LOW PLASTICITY; LOOSE; MOIST; SAND - V. FINE TO FINE, SUB-ROUND GRAVEL FINE TO COARSE; SUB ROUND.	
1					8					
					17					
					25					
2					22				A.A.	
					20					
3	30	50	5	0.0	14	C		SP	POORLY WELL GRADED SAND W/ GRAVEL; 10YR 6/3 - PALE BR; NO PLASTICITY; M. DENSE; DRY; SAND FINE; SUB-ANG. GRAVEL FINE TO COARSE; SUB ROUND TO ROUND	
					8					
					14					
4					12					
					13					

SB-42-48A 13:08

SB-42-48B 13:14

TD=5'

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

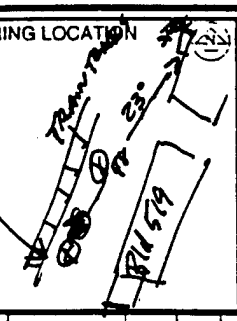
PAGE 1 OF 1

PROJECT NO. 2942.0170

SB-42-049

SB-42-049

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-22 Date Completed: 10-22-93
Logged By: BKH
Water Elevation (ft.): N/A
Date Measured:
Total Depth (ft.): 5'
Diameter (in.): 2.5"

Monitoring Well No.: N/A
Northing: N/A Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 395' @ 28° TO STACK
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 - HSA

Well Screen: Diameter Depth Slot Size
Casing: Diameter N/A Length Type
Sand Bentonite Seal Cement Grout Seal

SB-42-49A
+ SP277 DNAPL 269
13:41

SB-42-49B

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	20	55	25	0.0	5	C		SM	SILTY SAND W/ GRAVEL 10YR 4/1 BLACK; LOW PLASTICITY; LOOSE; MOIST TO WET; SAND V. FINE TO FINE, SUB ROUND. SPARSE FINE GRAVEL, FINE, ROUND TO SUB ROUND. CONTAINS WOOD CHUNKS.	394
					6					
1								SM	GRADES TO SILTY SAND 10YR 5/3 BROWN (SPARSE GRAVEL ~5%) LOW PLASTICITY; LOOSE; MOIST; SAND V. FINE TO FINE, SUB ROUND.	
	5	65	30		10	C				
					7					
2		80	20	0.0	8	C			SILTY SAND A-4.	
					23					
3								SW-SM	WELL GRADED SILTY SAND W/ GRAVEL; 10YR 6/3 - PALE BROWN; NO PLASTICITY; DENSE; DRY; SAND V. FINE TO MEDIUM; SUB ANG TO SUB-ROUND. GRAVEL FINE TO COARSE, SUB ANG TO SUB ROUND. GRAVEL IS LIMESTONE.	
	30	60	10	0.0	20	C				
					54					
4					60					
					42					

SB-42-49B

TD=5'

PROJECT NO. 2942.0170

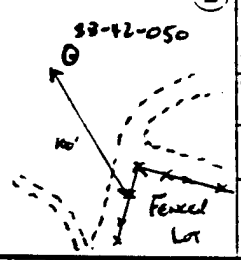
* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

BORING LOCATION



Project: TEAD-N Phase II
SWMU No. 42
Date Drilled: 5/21/97 Date Completed: 11
Logged By: DKH
Water Elevation (ft.):
Date Measured:
Total Depth (ft.):
Diameter (in.):
Well Screen: Diameter Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

Monitoring Well No.:
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor:
Drilling Method: Hand Auger

SB-42-050

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	<5%	80%	15-20%	-0-	N/A			SM	Dark Brown (7.5YR 3/2) slightly moist silty Sand; About 80% V. fine to medium sub-rounded sand; about 15%-20% fines; Non-Plastic; loose. <5% fine Gravel. Contains 1%-2% fine metal frags. Mod. HCl Reac.	
1									As Above - fewer metal frags.	
									(TD = 1.0')	
2										
3										
4										

SB-42-050A
SB-42-050B

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

BORING LOCATION

SB-42-051

≈200'

Decon pad

Summ 27

Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 5/31/94 Date Completed: "
Logged By: TKN

Water Elevation (ft.):
Date Measured:

Total Depth (ft.): 2'
Diameter (in.):

Monitoring Well No.:
Northing: Easting:

Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)

Drilling Contractor:
Drilling Method: Auger (Hand)

Well Screen: Diameter Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

SB-42-051

LITHOLOGIC DESCRIPTION
(USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION
0	60%	35%-40%	5%	-0-		Grab		GW	Very Dark Grayish Brown (10YR 3/2) slty. moist well-Graded Gravel w/ Sand; About 60% fine to Coarse sub-rounded to Angular Gravel, loose. About 35%-40% fine to Coarse Sand; Non-Plastic. ≤5% fines. Contains ferrous metal frags. (Strong HCl Reaction) SB-42-051A
1								SW-SM	
2									Brown (10YR 4/3) slty. moist well-Graded Sand w/ Silt; About 80%-85% fine to fine Sand. loose. About 10%-15% fines, Non-plastic. About 5% fine gravel. (Weak HCl reaction) SB-42-051B
3									TD@ 2.0'
4									

ELEVATION (FEET)

PROJECT NO. 2942.0170

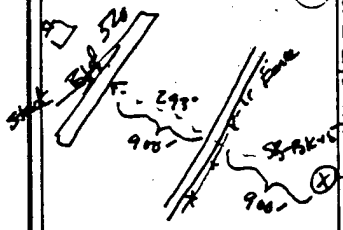
*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

SB-BK-015

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-23 Date Completed: 10-23-93
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 2.5"

Monitoring Well No.:
Northing: NA Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 293° TO STACK @ 1800'
Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 - HSA

Well Screen: Diameter Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	0	70	30	0.0	3			SM	SILTY SAND; 10YR 3/3 - DK BROWN; NO TO LOW PLASTICITY; LOOSE; SLIGHTLY MOIST; SAND V. FINE TO FINE, SUB ROUND.	
1					5					
					35					
2	45	45	10		49			SW-SM	WELL GRADED SAND W/ SILT AND GRAVEL; 10YR 6/3 - PALE BROWN; NO PLASTICITY; V. DENSE; DRY. SAND V. FINE TO COARSE, SUB-ANGULAR GRAVEL - FINE TO COARSE, SUB-ANGULAR TO SUB-ROUND.	
					65					
3					77				TD = 3'	
4										

SB-BK-015A

SB-BK-B

PROJECT NO. 2942.0170

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

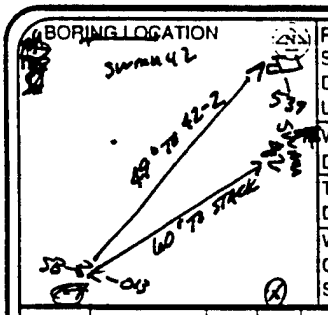
MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

SB-BK-013

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 42
Date Drilled: 10-23 Date Completed: 10-23-95
Logged By: BKH
Water Elevation (ft.): NA
Date Measured:
Total Depth (ft.): 3'
Diameter (in.): 2 5/8"

Monitoring Well No: NA
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929) 60° TO STACK, 49° TO 42-2
Drilling Contractor: OVERLAND
Drilling Method: CME 750 - HSA

Well Screen: Diameter NA Depth Slot Size
Casing: Diameter NA Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	3	60	37	0.0	4	C		SM	SILTY SAND; 10YR 4/4 dk YELLOWISH BROWN; NO TO LOW PLASTICITY; LOOSE; SLIGHTLY MOIST; SAND- FINE TO COARSE, SUB-ANGULAR. GRAVEL - FINE, SUB RND. CONTAINS ROOTLETS	
					6					
1					14					
	1	64	35	0.0		C			A.A.	
2										
3									TD = 3 FT	
4										

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

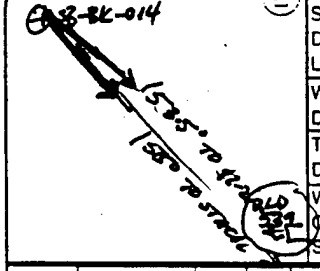
PAGE 1 OF 1

PROJECT NO. 2942.0170

SB-BK-134

SB-BK

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 47
Date Drilled: 10-23 Date Completed: 10-23-98
Logged By: BK

Water Elevation (ft.): NA
Date Measured:

Total Depth (ft.): 3'
Diameter (in.): 2.5"

Well Screen: Diameter ____ Depth ____ Slot Size ____
Casing: Diameter NA Length ____ Type ____
Sand ____ Bentonite Seal ____ Cement Grout Seal ____

Mon. Sampling Well No.: SB-BK-014
Northing: ____ Easting: ____

Ground Surface Elevation (ft.): ____
Measuring Point is Ground Surface
Datum: NGVD (1929) 153° TO STACK 153° TO STACK

Drilling Contractor: OVERLAND DRILLING
Drilling Method: CME 750 - HSA

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0		70	30	0.0	2	C	1	SM	SILTY SAND; 10YR 3/2 very dk grayish brown; NO TO LOW PLASTICITY; ~~SLIGHTLY MOIST~~ LOOSE; SL. MOIST; SAND V. FINE TO FINE; SUB-ROUND	
					2					
1	20	55	25		5			SM	SILTY SAND W/ GRAVEL; 10YR 3/3 dk brown; NO TO LOW PLASTICITY; LOOSE; DRY. SAND - VERY FINE TO FINE, SUB ROUND TO SUB ANGULAR. GRAVEL FINE TO COARSE; SUB ROUND TO SUB-ANGULAR.	
	40	45	15	0.0	7	C			A.A.	
2					14					
					19					
3									TD = 3FT	
4										

SB-BK-14A 11/30

SB BK-14B 11/30

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

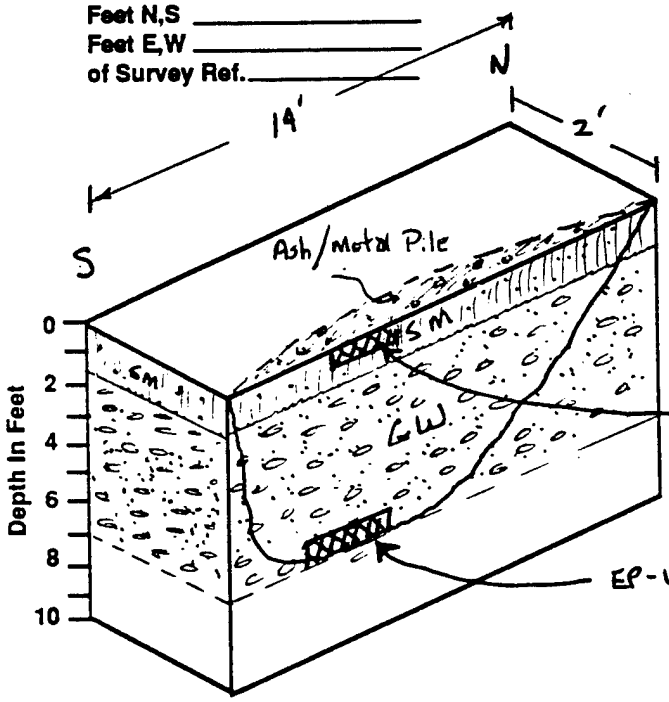
TEAD-N PHASE II RFI
SOIL BORING LOG

BOMB WASHOUT BUILDING
(SWMU 42)

EXCAVATION TEST PIT LOGS

TEST PIT EXCAVATION LOG

SWMU NO.: 42
TEST PIT LOG: TP EP-42-001
DATE EXCAVATED: 18 May 1994
TIME EXCAVATION BEGAN: 1440 hrs.
WEATHER CONDITIONS: P. cloudy, North breeze to 10mph; 60° F.
LOCATION OF TEST PIT REFERENCE POINT:
Feet N,S
Feet E,W
of Survey Ref.



Orientation = N-S
Total Depth = 7'
Length = 14'

SAMPLE NO.	SAMPLE LOCATION (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	VOC METER READINGS
EP-42-001 A	0-0.5'	SM	Very dark grayish brown (10YR 3/2), moist silty Sand. About 50%-60% well-graded v.fine to coarse sub-rounded to sub angular sand; About 30%-40% fines, low-plasticity. About 10%-15% fine sub-rounded gravel. Occasional sub-rounded Cobbles.	-0-
EP-42-001 B	6'-7'	GW	Lt. Brownish gray (2.5Y 6/2) dry to slty. moist well-graded gravel w/Sand. About 50% sub-rounded to rounded gravel & cobbles; About 50% well-graded v.fine to fine sand; < 5% fines. Non-plastic, loose. (Strong react. w/HCl)	-0-

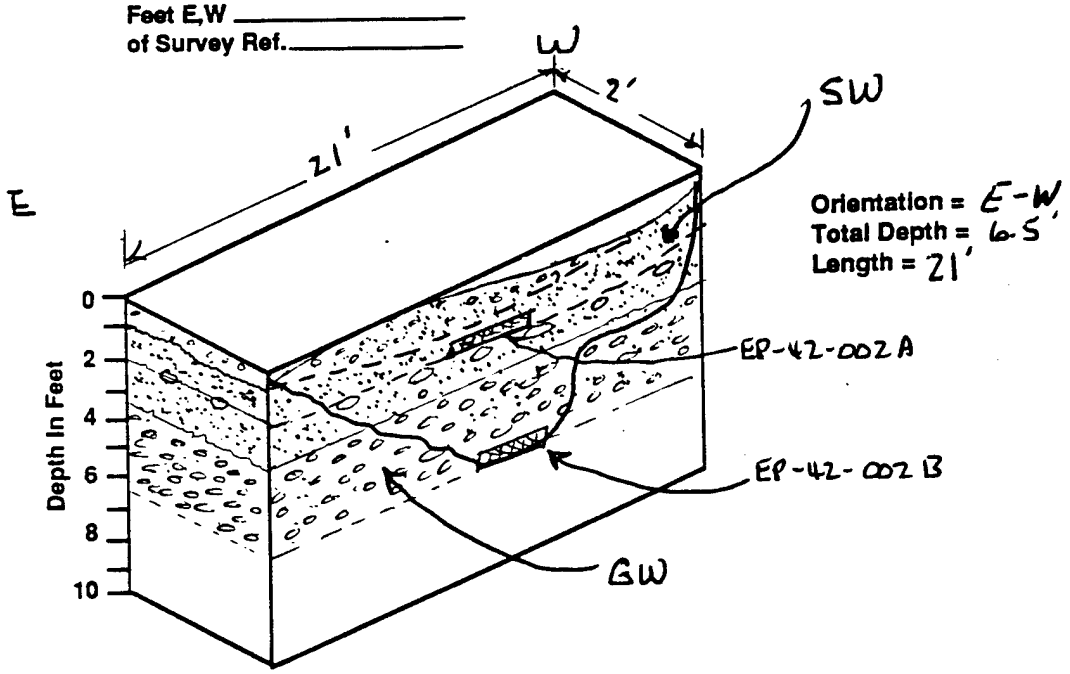
Comment: Test pit excavated at site of large, approx. 15' diameter Ash/frag pile. Samples collected from under pile at 0-6" and at 6'-7' bgs.

DCH

PROJECT NO. 2942.0120

TEST PIT EXCAVATION LOG

SWMU NO.: 42
TEST PIT LOG: TP EP-42-002
DATE EXCAVATED: 19 May 1994
TIME EXCAVATION BEGAN: 1060 hrs.
WEATHER CONDITIONS: P. cloudy, South Breeze 10-15 mph, 60°F.
LOCATION OF TEST PIT REFERENCE POINT:
Feet N,S
Feet E,W
of Survey Ref.



Orientation = E-W
Total Depth = 6.5'
Length = 21'

SAMPLE NO.	SAMPLE LOCATION (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	VOC METER READINGS
EP-42-002 A	2.5'-3'	SW	DK. Grayish Brown (10YR 4/2) Moist, well-Graded Sand; about 80°-90° u.fine to medium, sub-rnd. to sub-angular loose Sand; 5% fines, Non-Plastic; 5%-10% fine Sub-rounded Gravel; mod. react. w/ HCl.	- D -
EP-42-002 B	5'-6'	GW	Brown (10YR 5/3) dry to sl. moist well-Graded Gravel w/ Sand; about 60% fine to Coarse sub-rounded Gravel (w/ caliche rinds); 35%-40% fine to med. sub-round to sub-Angular loose, Sand; ≤ 5% fines; Non-Plastic. Strong HCl reaction. Cobbles to 12" in dia.	- D -

Comment:
Debris in trench includes a 2' x 3' x ¼" thick sheet metal Plate, Powder can lid, miscell. lid.

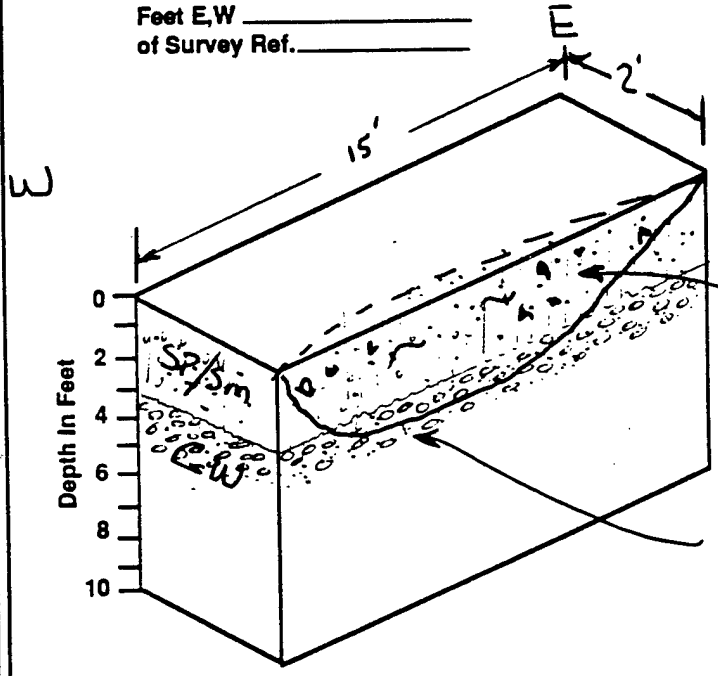
DCR

PROJECT NO. 2942.0120

TEAD-N PHASE II RFI

TEST PIT EXCAVATION LOG

SWMU NO.: SWMU 42
TEST PIT LOG: TP EP-42-003
DATE EXCAVATED: 18 MAY 1994
TIME EXCAVATION BEGAN: 0920 hrs.
WEATHER CONDITIONS: CLEAR to P. cloudy; 55° F.
LOCATION OF TEST PIT REFERENCE POINT:
Feet N,S
Feet E,W
of Survey Ref.



Orientation = E-W
Total Depth = 4'
Length = 15'

SP/Sm - dk. Grayish Brown Sand/Silt - disturbed Soil / Backfill

GW - Brownish Gray, dry well-graded Gravel w/ Cobbles; about 50% - 60% fine to coarse sub-rounded to rounded Gravel w/ 35% - 40% loose Sand. < 5% fines, loose. Non-Plastic. In-Place.

SAMPLE NO.	SAMPLE LOCATION (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	VOC METER READINGS

~ No Analytical Samples Collected ~

Comment: Trench is actually a cut through a 3'-4' mound of soil. A few banding rods and wood fragments (burned + unburned) found in top 36".

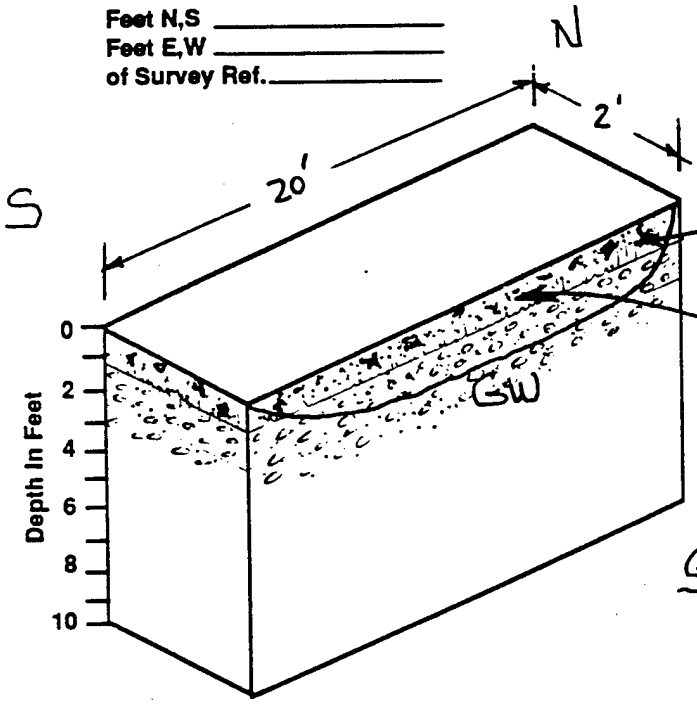
PROJECT NO. 2942.0120

TEAD-N PHASE II RFI

DCK

TEST PIT EXCAVATION LOG

SWMU NO.: SWMU 42
TEST PIT LOG: TP EP-42-004
DATE EXCAVATED: 17 May 1994
TIME EXCAVATION BEGAN: 1235 Hrs.
WEATHER CONDITIONS: P.Cloudy, 65-70° F
LOCATION OF TEST PIT REFERENCE POINT:
Feet N,S
Feet E,W
of Survey Ref.



Minor metallic debris (upper 10")

Orientation = N-S,
Total Depth = 2.5' bgs
Length = 20'

SM ~ dk. Grayish Brown; moist silty Sand; 50%-60% well-Graded fine to coarse Sand; 30%-40% fines, low Plasticity.

GW ~ brownish Gray; dry well-Graded Gravel w/Sand. About 50% Sub-rounded to rounded Gravel w/cobbles to 20" dia. w/Calcareous minds ("caliche"). About 50% well-Graded Sand, Loose. Non-Plastic.

SAMPLE NO.	SAMPLE LOCATION (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fl, moisture, plast.)	VOC METER READINGS

~ No Analytical Samples Collected ~

Comment: Minor Debris found ~ steel fragments, tin scrap, 2" steel PIPE, water meter covers, Plumbing Parts, Stove(?) Parts; All in UPPER 6"-10" of trench.

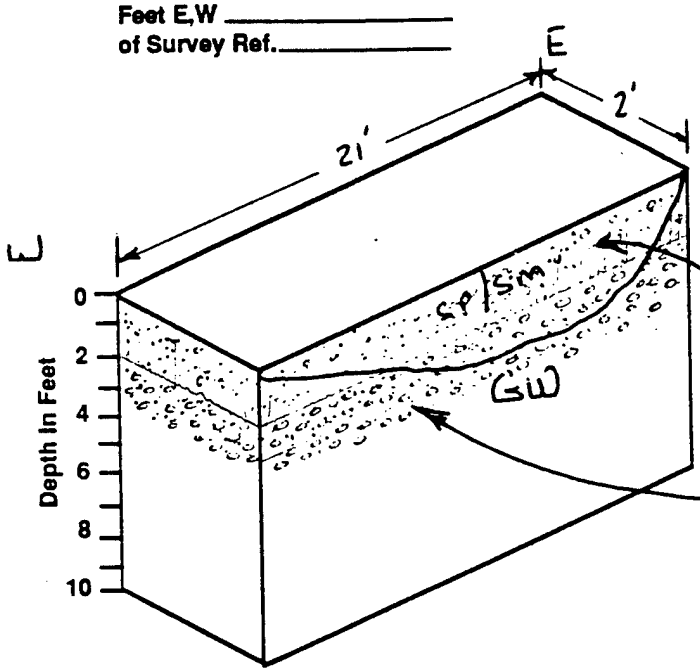
DCL

PROJECT NO. 2942.0120

TEAD-N PHASE II RFI

TEST PIT EXCAVATION LOG

SWMU NO.: SWMU 42
TEST PIT LOG: TP EP-42-005
DATE EXCAVATED: 18 MAY 1994
TIME EXCAVATION BEGAN: 1150 Hrs.
WEATHER CONDITIONS: P. Cloudy, 60° F.
LOCATION OF TEST PIT REFERENCE POINT:
Feet N,S
Feet E,W
of Survey Ref.



Orientation = E-W
Total Depth = 3'
Length = 21'

SP/SM - disturbed fill material; well-graded sand w/ silt. DK. Grayish Brown, Low Plasticity

GW - Brownish-Gray, Dry to SLHty. Moist well-Graded Gravel; Contains Cobbles up to 12" dia. Caliche rinds. 50%-60% Sub-rounded to rounded Gravel; 40%-50% Loose, Non-Plastic sand.

SAMPLE NO.	SAMPLE LOCATION (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	VOC METER READINGS

~ No Analytical Samples Collected ~

Comment: Disturbed Soil/Fill in upper 1'-2' of trench. Found .50-cal brass, .30-cal brass, Ammo can lids, 8-GA. & 10-GA. shotgun brass in upper 18".

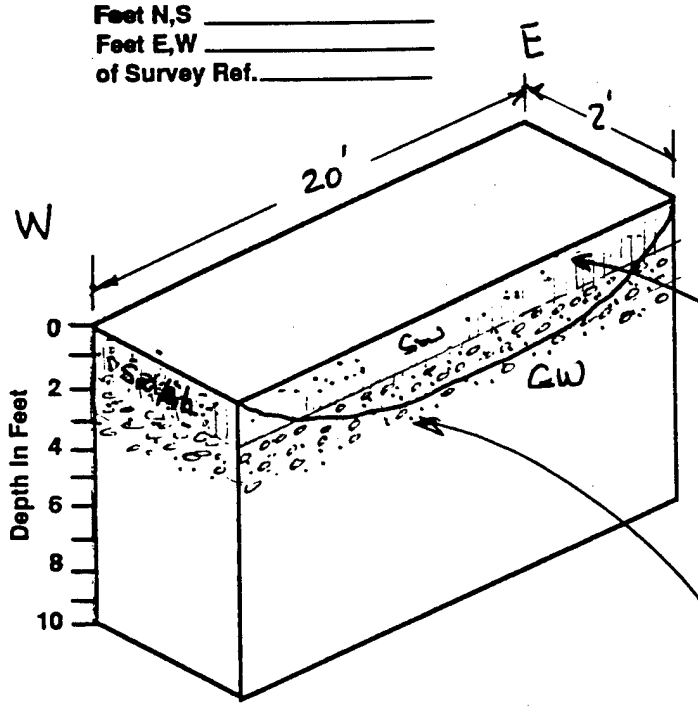
DCL

PROJECT NO. 2942.0120

TEAD-N PHASE II RFI

TEST PIT EXCAVATION LOG
James M. Montgomery, Consulting Engineers, Inc.

SWMU NO.: SWMU 42
TEST PIT LOG: TP EP-42-DD6
DATE EXCAVATED: 18 May 1994
TIME EXCAVATION BEGAN: 1315 hrs.
WEATHER CONDITIONS: P. Cloudy, 65° F.
LOCATION OF TEST PIT REFERENCE POINT:
Feet N,S
Feet E,W
of Survey Ref.



Orientation = E-W,
Total Depth = 2 1/2
Length = 20'

SW ~ Grad. Brown well-Graded Sand w/Silt ~ about 50%-60% well-Graded sand; about 35%-40% fines, low-Plasticity; 5% fine Gravel.

GW ~ Brownish-Gray, loose, well-Graded Gravel w/Sand.

SAMPLE NO.	SAMPLE LOCATION (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	VOC METER READINGS

~ No Analytical Samples Collected ~

Comment: No debris encountered.

JMM

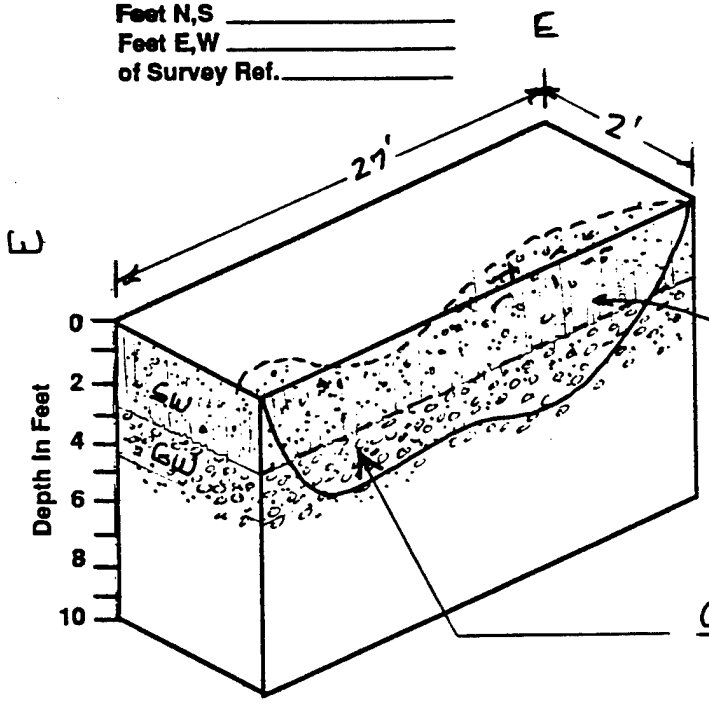
DCK

TEAD-N PHASE I RFI

PROJECT NO. 2942.0120

TEST PIT EXCAVATION LOG
James M. Montgomery, Consulting Engineers, Inc.

SWMU NO.: SWMU 42
TEST PIT LOG: TP EP-42-007
DATE EXCAVATED: 19 May 1994
TIME EXCAVATION BEGAN: 1115 hrs.
WEATHER CONDITIONS: clear to P. cloudy, 15mph SE Breeze, 65°F.
LOCATION OF TEST PIT REFERENCE POINT:
Feet N,S
Feet E,W
of Survey Ref.



Orientation = E-W,
Total Depth = 4 1/2'
Length = 27'

SW - Grayish Brown, Silty, Moist, well-Graded Gravel w/silt, about 60% u.f.m.c to medium sand, about 30% fines, Non- to low Plasticity, Loose, about 10% f.m.c. sub-rounded Gravel.

GW - Lt. Brownish Gray, f.m.c. to coarse, sub-rounded Gravel, 5% cobbles to 12" diameter, Caliche, about 50%-60% Gravel, about 35%-40% well-Graded loose Sand. (<5% fines)

SAMPLE NO.	SAMPLE LOCATION (ft.)	USCS SOIL TYPE	SOIL DESCRIPTIONS (color, % gv, % sa, % fl, moisture, plast.)	VOC METER READINGS

~ No Analytical Samples Collected ~

Comment: Debris Noted includes .50-cal brass (1), rubber washers, shotgun brass, flash tube, buckle, E.D. tape from smokeless Powder can.

JMM

TYK

TEAD-N PHASE I RFI

PROJECT NO. 2942.0120

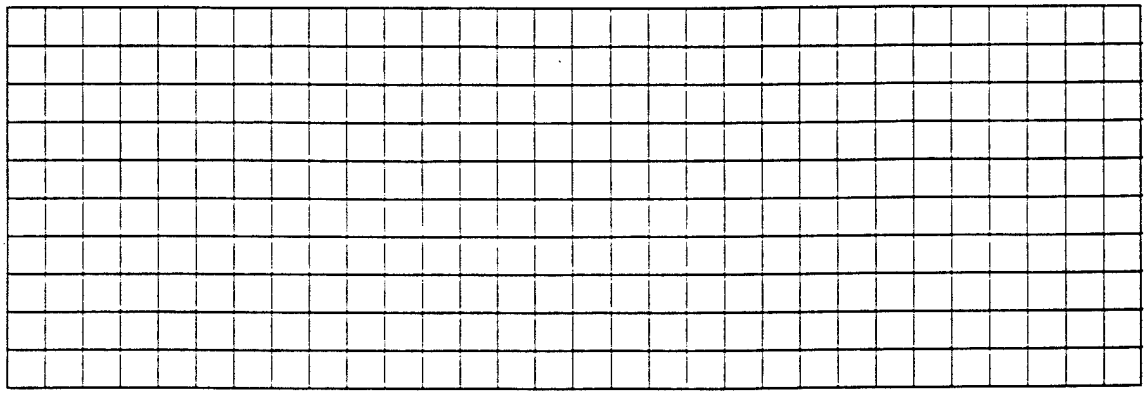
BOMB WASHOUT BUILDING
(SWMU 42)

SURFACE SOIL SAMPLING LOGS

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-42-017
DATE SAMPLED: 9/9/95
TIME: 1050
WEATHER CONDITIONS: Clear, Hot, No Breeze
LOCATION OF SAMPLING REFERENCE POINT: SS-42-047

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0-3"	GM	Light brown, silty gravel	0	(Grab) Composite Other

Comment: Fill and a little native at bottom of hole.

PROJECT NO. 2942.0160 7/13/95

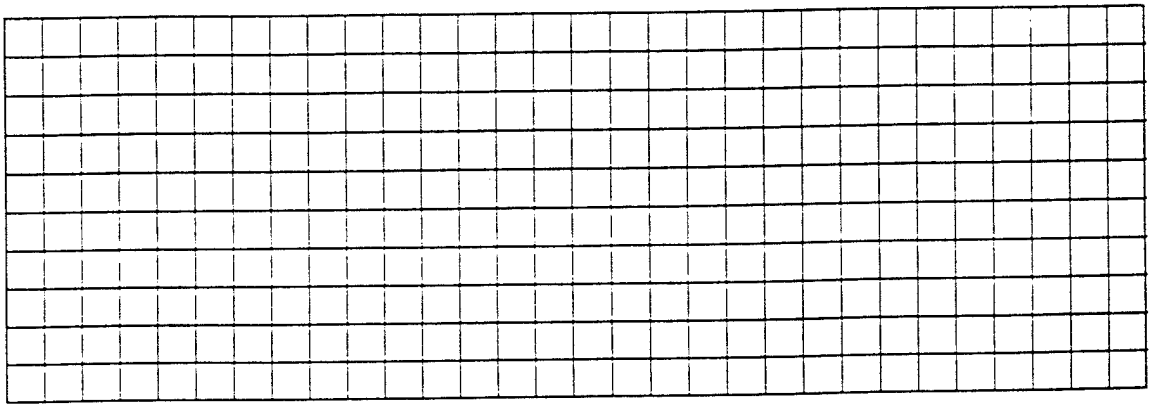
MONTGOMERY WATSON

ATTACHMENT 1

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-042-018
DATE SAMPLED: 8/9/95
TIME: 1220
WEATHER CONDITIONS: Sunny, hot slight breeze out of North
LOCATION OF SAMPLING REFERENCE POINT: SS-042-018

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0-3"	GM	Gray silty gravel dry	0	(Grab) Composite Other

Comment: ~~near~~ next to metal trash

PROJECT NO 2942 0160 7/13/95

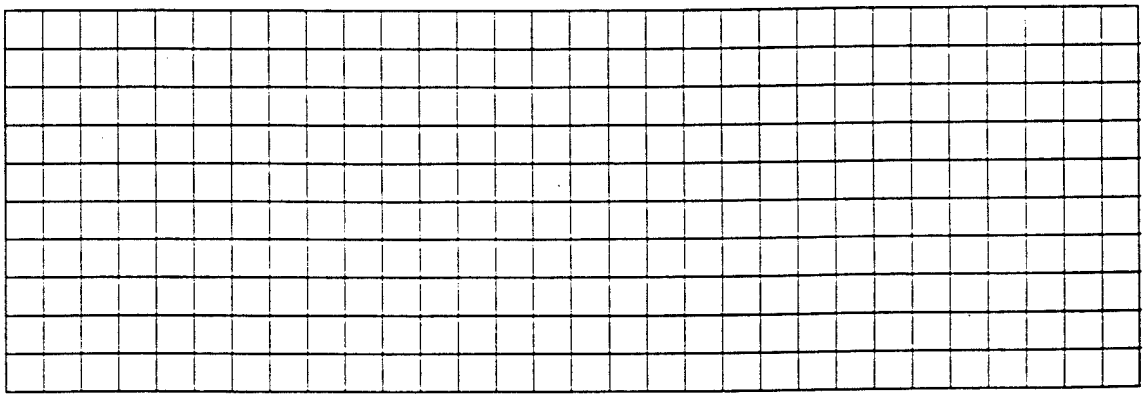
MONTGOMERY WATSON

ATTACHMENT 1

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-42-019
DATE SAMPLED: 8/9/95
TIME: 1110
WEATHER CONDITIONS: Sunny clear, Hot No Breeze
LOCATION OF SAMPLING REFERENCE POINT: SS-42-019

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0 to 3"	ML	Light gray, silt with wood, hair, plastic, etc. (trash) Fill in waste ditch	0	(Grab) Composite Other

Comment: from former waste ditch

PROJECT NO 2942.0160 7/13/95

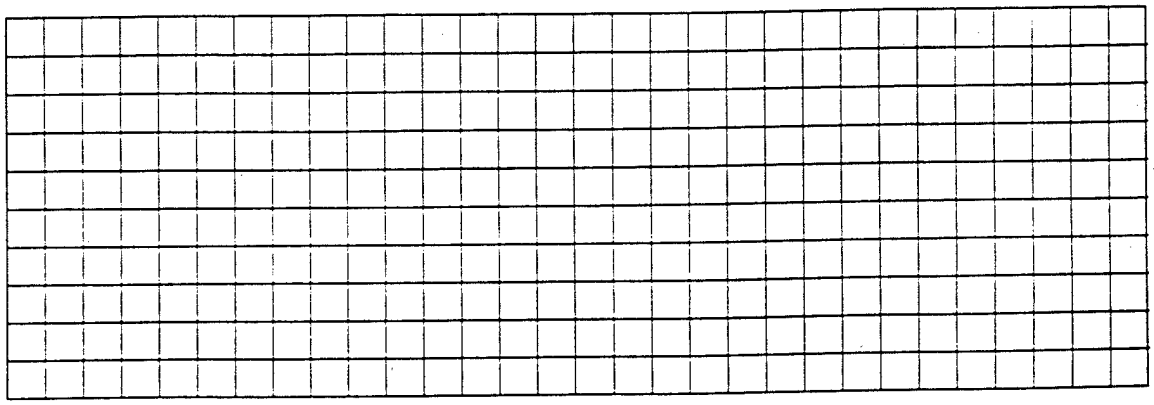
MONTGOMERY WATSON

ATTACHMENT 1

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-42-020
DATE SAMPLED: 8/9/95
TIME: 1120
WEATHER CONDITIONS: Hot, Clear, No Breeze
LOCATION OF SAMPLING REFERENCE POINT: SS-42-020

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0-3"	GM	Gray silty Gravel, dry	0	(Grab) Composite Other

Comment: from exit of steel lined ditch and pipe

PROJECT NO 2942 0160 7/13/95

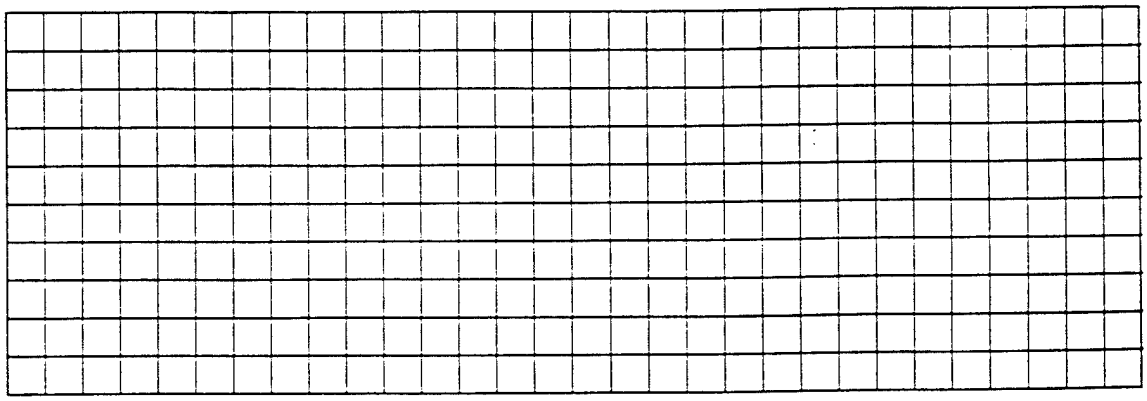
MONTGOMERY WATSON

ATTACHMENT 1

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-042-021
DATE SAMPLED: 8/9/95
TIME: 1140
WEATHER CONDITIONS: Sunny hot, slight breeze out of N.
LOCATION OF SAMPLING REFERENCE POINT: SS-420-021

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0-3"	GM	Gray, silty Gravel	0	(Grab) Composite Other

Comment: from waste water ditch

PROJECT NO. 2942.0160 7/13/95

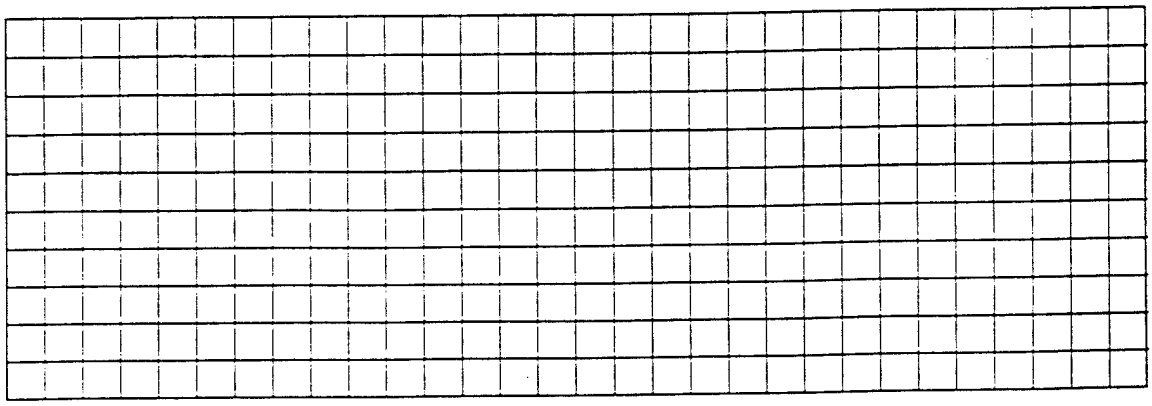
MONTGOMERY WATSON

ATTACHMENT 1

TEAD-N PHASE II
SURFACE SOIL/SEDIMENT SAMPLING LOG
Montgomery Watson

SAMPLE ID: SS-042-022
DATE SAMPLED: 8/9/95
TIME: 1200
WEATHER CONDITIONS: Sunny, slight breeze and 5° North
LOCATION OF SAMPLING REFERENCE POINT: SS-042-022

Meters N,S _____
Meters E,W _____
of Survey Ref. _____



LOCATION SKETCH

SAMPLE DEPTH (ft.)	USCS	SOIL DESCRIPTIONS (color, % gv, % sa, % fi, moisture, plast.)	HNU READINGS	TYPE SAMPLE (Circle)
0-3"	ML	Gray, gravelly SILT, dry	0	(Grab) Composite Other

Comment: next to ash pile

PROJECT NO 2942 0160 7/13/95

MONTGOMERY WATSON

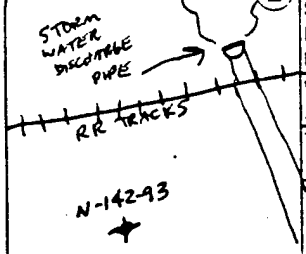
ATTACHMENT 1

STORMWATER DISCHARGE AREA
(SWMU 45)

SOIL BORING LOGS

Monitoring Well N-142-93

BORING LOCATION



Project: TEAD-N PHASE II RFI
SWMU No. 45
Date Drilled: 10-6-93 Date Completed: 10-19-93
Logged By: BRIAN HAMOS
Water Elevation (ft.): _____
Date Measured: _____
Total Depth (ft.): 377'
Diameter (in.): 9"

Monitoring Well No.: N-142-93
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: LAYNE
Drilling Method: PERCUSSION HAMMER - AIR CIRCULATION

Well Screen: Diameter 4" Depth 375'-355' Slot Size .020
Casing: Diameter 9" Length 360' Type SCHEDULE 40 PVC
Sand 10-20 Bentonite Seal 1/4" PELLETS Cement Grout Seal TYPE I-II LOW ALKALI

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	20	40	40	0	11	SS	75%	SM	SILTY SAND; BROWN (10YR 5/3); FROM VERY FINE SAND TO PEBBLE GRAVEL UP TO 30 mm IN DIA., SUBANGULAR TO SUBROUNDED; ~~LOW PLASTICITY~~ NON-PLASTIC, LOOSE; DRY	
1					20					
					37					
2					39					
3										
4										

SAMPLE INTERVAL

ALL COLORS FROM MUNSELL SOIL COLOR CHART

DRILL PIPE IS IN 10' LENGTHS, DUAL WALL, 6" I.D., 9" O.D.

SAMPLES COLLECTED WITH SPLIT SPOON (SS). 24" LONG, 2½" I.D.

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PROJECT NO. 2942.0170

Project: SWMU 45
JMM Boring No.: N-142-13

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT.	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
5	90	5	5	0	10	SS	75%	GM	SILTY, SANDY, GRAVEL; BROWN (10YR 5/3); FINE ROUNDED SAND; GRAVEL FROM VERY FINE TO VERY COARSE (60 MM IN DIA.). ANGULAR TO ROUNDED; ~~LOW PLASTICITY~~ BDH NON-PLASTIC; LOOSE; DRY.	
					21					
6					28					
					50/5" (ref)					
7										
8										
9										
10	90	5	5	0	7		50%	GM	SILTY, SANDY, GRAVEL; BROWN (10YR 5/3); VERY FINE SAND TO GRAVEL UP TO 60 MM IN DIA., ANGULAR TO WELL ROUNDED; ~~LOW PLASTICITY~~ BDH NON-PLASTIC; LOOSE; DRY.	
					19					
11					20					
					26					
12										
13										
14										

sample interval

PROJECT NO. _____

Project: TEAD-N PHASE II RFI SWMU-45
JMM Boring No.: N-142-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
15	100			0	6	SS	10%	GW	GRAVEL; BROWN (10YR5/3); GRAVEL RANGES FROM 5mm TO 5: mm IN DIA., ANGULAR TO WELL ROUNDED; ~~LOW PLASTICITY~~ NON-PLASTIC, LOOSE; DRY (RDH)	
					13					
16					21					
					24					
17										
18										
19										
20	60	40	-	0	22	SS	60%	GM	SANDY GRAVEL; BROWN (10YR5/3); VERY FINE SAND TO GRAVEL UP TO 65 mm IN DIA., SUBANGULAR TO ROUNDED; ~~LOW PLASTICITY~~ NON-PLASTIC, LOOSE; DRY (RDH)	
					25					
21					23					
					24					
22										
23										
24										

PROJECT NO. ____

Project: SWMH 45
JMM Boring No.: N-142-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
25				0	8	SS	5%	GW	GRAVEL; DARK GRAYISH BROWN (10YR4/2); GRAVEL FROM 5mm TO 45mm IN DIA; SUBROUNDED; LOW PLASTICITY; LOOSE; DRY.	
					50 for 3"					
26										
27										
28										
29										
30	70	30		0	6	SS	100%	SC	CLAYEY SAND; GRAY (10YR6/1); VERY FINE TO FINE GRAINED SAND; ROUNDED; WELL SORTED; SLIGHT PLASTICITY; SOFT; MOIST TO WET	
					6					
31					10					
					11					
32										
33										
34										

PROJECT NO. _____

Project: SWMU-45
JMM Boring No.: N142-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
35		60	40	0	4	SS	100%	SC	CLAYEY SAND; GRAY (10YR 6/1); FINE SAND; ROUNDED; MODERATE PLASTICITY; SOFT; WET	
					4					
36					4					
					6					
37										
38										
39										
40		35	65	0	3	SS	100	CH	SANDY CLAY; VERY FINE SAND; ROUNDED; PLASTIC; SOFT; WET	
					4					
41					4					
					5					
42										
43										
44										

PROJECT NO. _____

Project: SWMM 45
JMM Boring No.: N-142-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)
45		30	70	0	3	SS	75%	CH	SANDY CLAY; LIGHT OLIVE GRAY (5Y 6/2); VERY FINE SAND; ANGULAR; PLASTIC; MEDIUM STIFF; WET.
					22				
46	80		20		50 for 3"			GC	CLAYEY GRAVEL; LIGHT OLIVE GRAY (5Y 6/2); GRAVEL FROM 5 mm TO 25 mm IN DIA; ANGULAR; NON-PLASTIC; LOOSE; MOIST.
47									
48									
49									
50	90	5	5	0	10	SS	75%	GM ~~GW~~ BDH	SILTY GRAVEL; GRAYISH BROWN (10YR 5/2); SIZE FROM COARSE SAND TO GRAVEL 60 mm IN DIA., ANGULAR TO ROUNDED; NON-PLASTIC; LOOSE; ~~DRY~~
					22				
51					25				
					33				
52									
53									
54									

ELEVATION (FEET)

PROJECT NO.

Project: SWMH 45
JMM Boring No.: N-142-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
55	90		10	0	3	SS	60%	GC	CLAYEY GRAVEL; BROWN (10YR 5/3); GRAVEL FROM 10 TO 30 mm IN DIA.; ROUNDED; ~~NON-PLASTIC~~ LOW PLASTICITY; SOFT; MOIST	
					5			GM	SILTY, SANDY, GRAVEL; BROWN (10YR5/3); ~~SAND~~ DDH VERY	
56	85	10	5		40 for 3"				FINE TO FINE SAND; ANGULAR; GRAVEL TO 20mm IN DIA. ANGULAR TO ROUNDED; NON-PLASTIC; LOOSE; ~~MOIST~~	
57										
58										
59										
60	90		10	0	4	SS	80%	~~GW~~ DDH GC	CLAYEY GRAVEL; DARK YELLOWISH BROWN (10YR4/6); GRAVEL FROM 5 TO 30 mm IN DIA.; ROUNDED TO	
					13				WELL ROUNDED; NON-PLASTIC; LOOSE; MOIST	
61					15					
					39					
62										
63										
64										

PROJECT NO. _____

Project: SWMM 95
JMM Boring No.: N-142-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FT)
65				0	6	SS	60%	GC	AS PREVIOUS	
					20					
66	75	25	5					GM	SILTY, SANDY, GRAVEL; LIGHT GRAY (10YR 7/2); FROM FINE SAND TO GRAVEL 60 mm IN DIA.; ANGULAR TO SUBROUNDED; NON-PLASTIC; LOOSE; DRY.	
					29					
					38					
67										
68										
69										
70										
	75	25	0		9	SS	100%	SC	CLAYEY SAND; LIGHT GRAY (2.5 YR 7/1); VERY FINE SAND; ROUNDED; VERY PLASTIC; SOFT; MOIST.	
					9					
71					17					
					26					
72										
73										
74										

PROJECT NO. _____

Project: SWMM 45

JMM Boring No.: N-142-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
75	85		15	0	14	SS	30%	GC	CLAYEY GRAVEL; LIGHT GRAY (2.5 Y 7/1); GRAVEL FROM 5 mm TO 40 mm IN DIA.; SUBROUNDED TO ROUNDED; NON-PLASTIC; LOOSE; MOIST.	
					9 50/5"					
76										
77										
78										
79										
80	65 70 80H	5	30	0	15	SS	50%	GC	SANDY, CLAYEY GRAVEL; YELLOWISH BROWN (10YR 5/4); FROM COARSE SAND TO GRAVEL 60 mm IN DIA; SUBROUNDED TO ROUNDED; LOW PLASTICITY; LOOSE; MOIST.	
					38					
81					50 for 2"					
82										
83										
84										

PROJECT NO.

PAGE 9 OF 21

Project: SWMU 45
JMM Boring No.: N-142-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
85	70	15	15	0	50 for 5"	SS	20%	GC	CLAYEY, SANDY, GRAVEL; LIGHT BROWNISH GRAY (10YR 6/2); FROM COARSE SAND TO GRAVEL 35 MM IN DIA.; ANGULAR TO SUBROUNDED; MOIST TO WET.	
86										
87										
88										
89										
90	5	20	75	0	5	SS	100%	CL	GRAVELLY, SANDY, CLAY; YELLOWISH BROWN (10YR 5/4); VERY FINE SAND; GRAVEL TO 25 MM IN DIA; MODERATE PLASTICITY; MEDIUM STIFF; MOIST.	
91					8					
					19					
92					27					
93										
94										

PROJECT NO. _____

Project: SWMU 45

JMM Boring No.: N-142-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
95	60	25	15	0	8	SS	40%	GC	SANDY, CLAYEY, GRAVEL; LIGHT YELLOWISH BROWN (10YR 6/4); FINE TO COARSE SAND; ANGULAR; GRAVEL TO 60 mm IN DIA., ANGULAR TO SUBROUNDED; NON-PLASTIC; LOOSE; MOIST,	
					50 for 5"					
96										
97										
98										
99										
100	70	25	5	0	43	SS	30%	GM	SANDY GRAVEL; GRAYISH BROWN (10YR 5/2); FINE GRAINED SAND TO GRAVEL 60 mm IN DIA;	
					50 for 4"				ANGULAR TO ROUNDED; NON-PLASTIC; LOOSE; DRY.	
101										
102										
103										
104										

PROJECT NO. _____

Project: SWMU 45
JMM Boring No.: N-142-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
10 5					50 for 4"	SS	20%	GM	AS PREVIOUS.	
10 6										
10 7										
10 8										
10 9										
11 0	100				4	SS	10%	GW	GRAVEL; BROWN(10YR 5/3); RANGE FROM 10 TO 30 MM IN DIA.; SUBANGULAR TO WELL ROUNDED; NON-PLASTIC	
					5				LOOSE; DRY.	
11 1					8					
					8					
11 2										
11 3										
11 4										

PROJECT NO. _____

BEGIN 10-7-93

Project: SWMM 45
JMM Boring No.: N-142-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
11 5	95	5		0	8	SS	10%	GW	GRAVEL; BROWN (10YR5/3); SAND FROM FINE TO COARSE, ANGULAR; GRAVEL TO 50mm IN DIA; ANGULAR TO SUBROUNDED; NON-PLASTIC; LOOSE; DRY	
					50 for 2"					
11 6										
11 7										
11 8										
11 9										
12 0					7		0%		NO SAMPLE RECOVERY	
					50 for 1"					
12 1										
12 2										
12 3										
12 4										

PROJECT NO. _____

Project: SWMU 45

JMM Boring No.: N-142-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
125	80	10	10	0	4	SS	20%	GC	CLAYEY GRAVEL; BROWN (10YR 5/3); FINE SAND, ROUNDED; GRAVEL TO 40 mm IN DIA; ANGULAR TO SUBROUNDED; NON-PLASTIC; LOOSE; MOIST.	
					5					
126					18					
					34					
127										
128										
129										
130					8		0%		NO RECOVERY	
					50 for 2"					
131										
132										
133										
134										

PROJECT NO. _____

Project: SWMM-45
JMM Boring No.: N-142-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity; density: moisture content: additional facts)	ELEVATION (FEET)
135				0	11	SS	20%	GC	AS PREVIOUS	
					19					
136					50 for 5"					
137										
138										
139										
140	60	20	20	0	9	SS	30%	GC	BDH SANDY CLAYEY, GRAVEL; YELLOWISH BROWN CLAYEY, VERY FINE SAND; GRAVEL TO 30 mm IN DIA; MODERATE PLASTICITY; LOOSE; MOIST. SUBROUNDED	
					10					
141					4					
					13					
142										
143										
144										

PROJECT NO. _____

Project: SWMH 45
JMM Boring No.: N-142-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity; density: moisture content: additional facts)	ELEVATION (FEET)
145				0	7	SS	30%	GC	AS PREVIOUS	
					15					
146					26					
					29					
147										
148										
149										
150				0	21	SS	10%	GC	AS PREVIOUS	
					50 for 2"					
151										
152										
153										
154										

PROJECT NO. _____

Project: SWMU 45
JMM Boring No.: N-142-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
15									NO SAMPLE COLLECTED. DRILLING IS EXTREMELY HARD - COLLECTION OF SPLIT SPOON SAMPLE IS NOT PRACTICAL. (SEE DESCRIPTION BELOW)	
16									NO SPLIT SPOON COLLECTED. HARD DRILLING. MATERIAL COMING FROM THE CYCLONE CONSISTS OF SUBROUNDED TO ROUNDED COBBLES UP TO 8" IN DIAMETER. COBBLES ARE BLACK (N 2.5) MARBLE? ~~QUARTZITE?~~ BDH FINE GRAINED. ↓ Silicified limestone	

PROJECT NO.

Project: Sumh 45

JMM Boring No.: A-42-93

DEPTH (FEET)	GRAIN SIZE: % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
165									AS PREVIOUS.	
166										
167										
168										
169										
									ATTEMPTED TO DRIVE	
170					50 for 2"				~~DROVE~~ BDH SPLIT SPOON SAMPLER FROM 170'-172'. NO RECOVERY. COBBLES COMING FROM THE CYCLONE INCLUDE VERY PALE BROWN (10YR 7/4) ~~BDH~~ MEDIUM GRAINED QUARTZITE.	
171									FROM 152' TO 372' DRILLING	
									ENCOUNTERED GRAVEL RANGING FROM	
172									10mm IN DIAMETER TO 10 INCHES IN DIAMETER.	
									COBBLES WERE SUBANGULAR TO ROUNDED,	
									PREDOMINATELY QUARZITE AND LIMESTONES	
									AS DESCRIBED ABOVE. THIS DESCRIPTION IS	
173									FROM CYCLONE CUTTINGS ONLY AS ADVANCING	
									SPLIT SPOON SAMPLERS WAS NOT POSSIBLE.	
									FINES CONSTITUTED < 30% OF THE	
									CUTTINGS AND CONSISTED OF FINE TO MEDIUM	
174									SANDS WITH CLAY.	

PROJECT NO.

Project: SWMU 45

JMM Boring No.: N-142-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
175										
185										
195										
205										
215										
225										
235										
245										
255									CLAY SEAM FROM 251'-253'. THIS IS THE DRILLER'S CALL BASED ON EASE OF DRILLING AND CUTTINGS FROM THE CYCLONE.	
265										

↑ 10-7-93

↓ 10-8-93

PROJECT NO.

Project: SWMU 45
JMM Boring No.: N-142-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity; density: moisture content: additional facts)	ELEVATION (FEET)
275										
285										
295										
305										
315										
325										
335										
345										
									← FIRST WATER NOTICED IN CYCLONE @ 351'	
355										
									← FIRST "BIG" WATER SEEN IN CYCLONE @ 360'	
365										
375	20	80	0	-	-	-		CL	SANDY CLAY; YELLOWISH BROWN (10YR5/4); FINE GRAINED SAND, SUBROUNDED; MEDIUM PLASTICITY; MEDIUM STIFF; MOIST	

↑ 10-8-93
↓ 10-9-93

PROJECT NO. _____

Project: SWMU 45

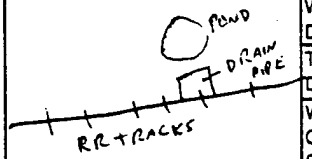
JMM Boring No.: N-142-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
5								CL	AS PREVIOUS	
									↓ DESCRIPTION BASED ON CUTTINGS FROM THE CYCLONE.	
6										
									TOTAL DEPTH OF BORING = 37'	
7										
8										
9										
0										
1										
2										
3										
4										

PROJECT NO. _____

Monitoring Well N-143-93

BORING LOCATION



Project: PHASE II RFI - TEAD-N
SWMU No. 45
Date Drilled: 10-26-93 Date Completed: 11-5-93
Logged By: BRIAN HAMOS
Water Elevation (ft.): _____
Date Measured: _____
Total Depth (ft.): 346'
Diameter (in.): 9"

Monitoring Well No.: N-143-93
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: LAYNE
Drilling Method: PERCUSSION HAMMER - AIR CIRCULATION

Well Screen: Diameter 4" Depth ~~346'~~ 345-325 Slot Size .020
Casing: Diameter 4" Length 325' Type SCHEDULE 40 PVC
Sand 10-20 SILICA Bentonite Seal 1/4" PELLETS Cement Grout Seal TYPE I-II LOW ALKALI

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
0										
	TR	20	80	0	5	SS	50%	CH	SANDY CLAY; DARK GRAY (7.5YR 4/1); VERY FINE GRAINED SAND; TRACE ANGULAR GRAVEL TO 30 MM IN DIA.) PLASTIC; SOFT; MOIST TO WET.	
					4					
1					4					
					4					
2										
3										
									ALL COLORS FROM MUNSELL SOIL COLOR CHART.	
									SAMPLES COLLECTED WITH SPLIT SPOON (SS) SAMPLER, 24" LONG, 2½" I.D.	
4									DRILL PIPE IS IN 10' LENGTHS, DUAL WALL, 6" I.D., 9" O.D.	

sample interval

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

Project: SWMU 45
JMM Boring No.: N-143-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
5	100			0	13	SS	50%	GW GP BOH	GRAVEL; GRAY (7.5YR 6/1); PEBBLE GRAVEL FROM 8 TO 40 mm IN DIA; ANGULAR TO ROUNDED; NON-PLASTIC;	
					13				DRY.	
6					10					
		80	20		8			SC	CLAYEY SAND; GRAY (7.5YR 6/1); VERY FINE GRAINED SAND; WELL SORTED; SOFT; MOIST TO WET.	
7										
8										
9										
10									BROWN (10YR 5/3)	
	85	10	5	0	5	SS	80%	GM	SANDY GRAVEL; FROM COARSE SAND TO GRAVEL 25 mm IN DIA; SUBANGULAR TO ROUNDED; NON-PLASTIC;	
					9				LOOSE; MOIST.	
11					11					
					13					
12										
13										
14										

Sample interval

PROJECT NO.

Project: SWMH 45
JMM Boring No.: N-143-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity; density: moisture content: additional facts)	ELEVATION (FEET)
5		40	60	0	4	SS	100%	CL	SANDY CLAY; LIGHT BROWNISH GRAY (2.5Y 6/2); VERY FINE SAND; MODERATE PLASTICITY; SOFT; MOIST TO WET.	
					3					
16					5					
					9					
17										
18										
19										
20	50	25	25	0	50 for 5"	SS	5%	GC	CLAYEY, SANDY, GRAVEL; LIGHT BROWNISH GRAY (2.5Y 6/2); FROM FINE SAND TO PEBBLE GRAVEL 30 mm IN DIA.; SUBROUNDED; NON-PLASTIC; LOOSE; MOIST TO WET.	
21										
22										
23										
24										

PROJECT NO. _____

Project: SWMU 45

JMM Boring No.: N-143-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAI	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)
25	65	25	10	0	12	SS	50%	GC	CLAYEY, SANDY, GRAVEL; BROWN (10YR 5/3); FROM FINE SAND TO GRAVEL 40 mm IN DIA; ANGULAR TO
					40				SUBROUNDED; NON-PLASTIC; LOOSE; MOIST.
26					50 for 2"				
27									
28									
29									
30				0	10	SS	75%	GC	AS ABOVE
					28				
31	85		15		31			GC	CLAYEY GRAVEL; YELLOWISH BROWN (10YR 5/4); GRAVEL FROM 8 TO 40 mm IN DIA, SUBROUNDED; NON-
					29				PLASTIC; LOOSE; MOIST.
32									
33									
34									

ELEVATION (FEET)

PROJECT NO. _____

Project: SWMM 45

JMM Boring No.: N-143-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
35	90	5	5	0	3	SS	40%	GC	SANDY, CLAYEY, GRAVEL; YELLOWISH BROWN (10YR 5/4); FROM COARSE SAND TO GRAVEL 10 mm W DIA; NON-PLASTIC; LOOSE; MOIST	
					4				SUBROUNDED	
36					15					
					26					
37										
38										
39										
40										
		60	40	0	4	SS	100%	SC	CLAYEY SAND; GRAY (10YR 6/1); FINE SAND TO MEDIUM SAND; ANGULAR; SLIGHT PLASTICITY; SOFT; MOIST TO WET.	
					5				GRAY (10YR 6/1)	
41		10	90		8			CL	SANDY CLAY; VERY FINE SAND; MEDIUM PLASTICITY; SOFT; MOIST TO WET.	
					13					
42										
43										
44										

PROJECT NO. _____

Project: SWMM 45
JMM Boring No.: N-143-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
45	100			0	7	SS	20%	GP	GRAVEL; GRAY (10YR 6/1); FROM 10 TO 30 mm IN DIA; SUBANGULAR TO ROUNDED; NON-PLASTIC; LOOSE; DRY.	
					21					
46					50 6"					
47										
48										
49										
50				0	9	SS	20%	GP	AS ABOVE	
					18					
51					50 6"					
52										
53										
54										

PROJECT NO. ____

Project: SWMH 45
JMM Boring No.: N-143-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
55	10	25	65	0	19	SS	30%	CL	SANDY, GRAVELLY CLAY; LIGHT BROWNISH GRAY (10YR 6/2) VERY FINE TO MEDIUM SAND, GRAVEL TO 20 mm, ANGULAR TO ROUNDED; MEDIUM PLASTICITY; SOFT; MOIST.	
56					12					
					15					
57					13					
58										
59										
60	10	15	15	0	10	SS	40%	GC	SANDY, CLAYEY, GRAVEL; LIGHT BRWNISH GRAY (10YR 6/2). VERY FINE SAND TO GRAVEL 35mm IN DIA; SUBANGULAR TO ROUNDED; LOW PLASTICITY; LOOSE; MOIST.	
					13					
61					17					
					29					
62										
63										
64										

PROJECT NO. ____

Project: SWMU 45

JMM Boring No.: N-143-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FT)
65									NO SPLIT SPOON DRIVEN. CUTTINGS FROM CYCLONE ARE AS DESCRIBED ABOVE.	
66										
67										
68										
69										
70	100			0	8	SS	10%	GW	GRAVEL; GRAY (10YR 6/1); FROM 10 TO 50 mm IN DIA; SUBANGULAR TO SUBROUNDED; NON-PLASTIC; LOOSE; DRY.	
					50 FOR 3"					
71										
72										
73										
74										

PROJECT NO. _____

Project: SWMU 45
JMM Boring No.: N-113-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
75				0	3	SS	100	GW	AS ABOVE	
					6					
76	5	25	70		5			CL	SANDY CLAY; YELLOWISH BROWN (10YR 5/4); FINE SAND, ANGULAR; MEDIUM PLASTICITY; SOFT; MOIST	
					8				↓ SOME ROUNDED GRAVEL UP TO 10 MM IN DIA.	
77										
78										
79										
80				0	3	SS	100	CL	SANDY CLAY AS ABOVE	
					3					
81					6					
					9					
82										
83										
84										

PROJECT NO. ____

Project: SWMU 45

JMM Boring No.: N-143-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
85	70	25	5	0	9	SS	50%	GM	SANDY GRAVEL; YELLOWISH BROWN (10YR 5/4); FROM MEDIUM SAND TO GRAVEL 35 mm IN DIA; ANGULAR TO SUBROUNDED; NON-PLASTIC; LOOSE; DRY.	
					20					
86					50 for 4"					
87										
88										
89										
90										
				0	13	SS	50%	GM	AS ABOVE	
	100				19			GW	GRAVEL; GRAY (10YR 5/1); FROM 10 mm TO 40 mm IN DIA.; SUBANGULAR TO SUBROUNDED; NON-PLASTIC;	
91					20				LOOSE; DRY.	
					28					
92										
93										
94										

PROJECT NO. _____

Project: SWMU 45
JMM Boring No.: N-143-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
95								GW	NO SAMPLER DRIVEN. CUTTINGS FROM CYCLONE AS DESCRIBED ABOVE.	
96										
97										
98										
99										
100									ATTEMPTED TO COLLECT SAMPLE, HOWEVER, A ROCK STUCK IN THE DRILL PIPE PREVENTED THE	
									SAMPLER FROM GOING TO THE BOTTOM OF THE HOLE.	
101								GM	CUTTINGS FROM THE CYCLONE CONSIST OF SANDY GRAVEL; DARK YELLOWISH BROWN (10YR 4/4); FROM COARSE SAND TO GRAVEL 50 mm IN DIA; ~~NON PLASTIC~~;	
									LOOSE; MOIST.	
102										
								?		
103			10	90				CL	FROM CYCLONE: SANDY CLAY; YELLOWISHISH BROWN (10YR5/4); VERY FINE SAND; MEDIUM PLASTICITY;	
									STIFF.	
104								BDH		
									CL ABOVE PLUGGED DRILL PIPE, CAUSING LOSS OF AIR CIRCULATION. ADDED ~ 10 GAL. OF WATER AND BLEW IT OUT.	

PROJECT NO. _____

Project: SWMM 45
JMM Boring No.: N-143-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity; density: moisture content: additional facts)	ELEVATION (FEET)
10 5				0	11	SS	100	CL	AS ABOVE	
	10	10	80		15			CL	GRAVELLY CLAY; YELLOWISH BROWN (10YR5/4); VERY FINE SAND; SUBROUNDED PEBBLE GRAVEL UP TO 10mm DIA; MEDIUM PLASTICITY; MEDIUM STIFF; MOIST.	
10 6					21			CL		
	100				50 for 2"			GW	GRAVEL; YELLOWISH BROWN (10YR5/4); FROM 10 TO 40 mm IN DIA.; ANGULAR TO SUBROUNDED; NON-	
10 7									PLASTIC; MOIST.	
10 8										
10 9										
11 0					50 for 5"				NO RECOVERY.	
11 1										
11 2										
11 3										
11 4										

PROJECT NO. _____

Project: SWMU 45
JMM Boring No.: N-143-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
115									DRILLING TOO HARD TO DRIVE A SPLIT SPOON SAMPLER.	
116										
117										
118										
119										
120	100			0	9	SS	5"	GW	256 mm in GRAVEL; BLACK (N2.5); COBBLES UP TO ~~10" DIA~~ BDH DIA; SILICIFIED LIMESTONE, FINE GRAINED; DRY.	
					50 FOR 4"					
121										
122										
123										
124										

10-20-93

10-21-93

PROJECT NO. _____

Project: JWMM 45
JMM Boring No.: N-143-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)
125									
135									
145								GW	CYCLONE CUTTINGS ~ AS ABOVE
		10	90					CL	146'-148': CYCLONE CUTTINGS: SANDY CLAY; LIGHT YELLOWISH BROWN (10YR 6/4); MEDIUM PLASTICITY; SOFT; MOIST. ↓ very fine sand
155								GW	→ AS PREVIOUS
165									
170									
175									
185									
195									
205								GW	MORE QUARTZITE GRAVEL (50%) SEEN IN THE CUTTINGS NOW.
215									
225									

10-21-93 ↑

10-22-93 ↓

PROJECT NO. _____

Project: SWMU 45
JMM Boring No.: N-143-93

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
225	70	15	15					GM	CYCLONE CUTTINGS: SILTY, CLAYEY, GRAVEL; DARK YELLOWISH BROWN (10YR 4/4); VERY FINE SAND, GRAVEL TO 30mm IN DIA., ROUNDED; LOW PLASTICITY; LOOSE; MOIST.	
235										
240								GW	240-250' VERY HARD. FINE PEBBLE GRAVEL (QUARTZITE & LIMESTONE) UP TO 8mm IN DIA; ANGULAR TO ROUNDED; DRY.	
245										
255								GM	AS PREVIOUS.	
265										
275										
285										
295								GW	290-300' EXTREMELY HARD. DESCRIPTION AS PREVIOUS.	
305										
315	75	15	10					GW	CYCLONE CUTTINGS: GRAVEL; YELLOWISH BROWN (10YR 5/4); FROM COARSE SAND TO PEBBLE GRAVEL 30 mm IN DIAMETER; SUBANGULAR TO ROUNDED; NON-PLASTIC; LOOSE; DRY.	
325										

10-22-93
10-23-93
10-24-93
10-25-93

PROJECT NO. _____

Project: SWMU 45

JMM Boring No.: N-143-93

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
325										
									10-25-93 ↑ WATER FIRST SEEN IN CYCLONE AT 331'. ↓ 10-26-93	
335										
345										
									TOTAL DEPTH @ 346' on 10-26-93. BEGIN WELL CONSTRUCTION ON 10-27-93	
355										
365										
0										
1										
2										
3										
4										

PROJECT NO. _____

500-Series Area Stormwater Line Investigation

Soil Boring Logs

BORING LOCATION

Project: TEAD-N
SWMU No. 45
Date Drilled: 5/23/94 Date Completed: _____
Logged By: MDL
Water Elevation (ft.): _____
Date Measured: _____
Total Depth (ft.): _____
Diameter (in.): _____

Monitoring Well No.: SB-45-0002
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: Earth Tech
Drilling Method: Hollow Stem

Well Screen: Diameter _____ Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)
0	40	50	10	NA	4				11:18 SD. well graded sand w/ gravel. 10YR 5/3 Brown sand med to V. Fine R-SA, Gravel med-coarse, R-SA, Fines non plastic, dry, low density. (Rock Blocked sampler, cutting at augers are the same.
1					16				
					9				
					10				
2	40	40	30	0	5				well graded sand w/ Gravel to well graded gravel w/ sand, 10YR 4/3 brown, sand coarse to fine R-SA, Gravel med to coarse, R-SA, Fine non Plastic to low Plasticity, low dense moist, (Fill).
3					3				
					2				
4	40	40	30		5				11:35 Same as above. (Poor recovery because.
					4				

ELEVATION (FEET)

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF ____

PROJECT NO. 2942.0170

Project: TRAD-N SPRING 45
JMM Boring No.: SB-45-002

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5					5				End of Back Fill.	
					30				sample block by boulder. very difficult to drill through	
6	20	50	30	0	3			SW	well graded sand with silt and gravel, 10YR 4/3 brown sand med to V. Fine, R-SA, Fines nonplastic to low Plas. Gravel medium R-SA, low density, moist, Trace of lightbrown mottling in silt.	sample #1
					2					
7					2					sample #2
	20	50	30	0	10			SW	same as above. with decrease in mottling.	
8					9					
					14				Rock Blocked sampler	
9	40	60		0	60			SW	well graded sand with gravel, 10YR 4/3 brown. sand coarse to V. Fine SA-SR. Gravel Course to medium, R-SA. High density, SL. moist.	sample #3 12
					58				(Filled only	
10					50					
	60	40		0	48			GW	well graded gravel w/ sand 10Y 8/1 light Brownish Gray Gravel R-SA, Sand Coarse to Fine, R-SA,	sample #4
11					54				High density, V. SL. moist, calcareous. Rin on gravel,	
		100		0	35			SW	well graded sand, 10YR 6/2 light Brownish gray, sand med to V. Fine R-SA, moderate density, Calcareous.	
12										
3										
4										

2½"

3"

PROJECT NO 2208.0504

BORING LOCATION

Project:
SWMU No.
Date Drilled: 5/23 Date Completed:
Logged By: MDL
Water Elevation (ft.):
Date Measured:
Total Depth (ft.):
Diameter (in.):
Monitoring Well No.: SB-4-2003
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor:
Drilling Method:
Well Screen: Diameter Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0				0	22 8	SS			Just surface gravel. logged cuttings.	
1	30	40	30	0	15	6		SM	well graded sand w/ gravel and silt, 10YR 3/3 Dark brown Sand coarse to V. Fine, A-SA, Gravel med. A-SA, moist, moderate dense.	
					16					
2					26					
	40	60			36	55		SW	Well graded sand w/ gravel ~~med~~ 10YR 5/3 brown Sand coarse to V. Fine, A-SA, Gravel med-coarse A-SA, mod to high Density, sl. moist.	
					60 5"					
3										
	50	50		0	48			SW/GW	well graded sand w/ gravel to well graded gravel w/ sand 10YR 5/2 grayish brown, Sand coarse to Fine SR-SA; gravel med to coarse A-SA, moderate dense, sl. moist, thin carbonate Rin on gravel, calcareous.	
4				0	52					
					53				Same as above.	

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PROJECT NO. 2942.0170

Project:

JMM Boring No.: DB-45-003

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAI	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
5	60	40		0	32			GW	Well graded gravel w/ sand 10YR 6/2 grayish brown. Gravel coarse to med, R-SA, Sand coarse to v.	sample 14:20
					40				Fine, R-SA, moderate dense, v. slightly moist, Calcarous Rine coating gravel grains, calcareous.	
6					40					
7	60	40		0	40			GW	well graded gravel w/ sand, 10YR 6/2 same as above with increase in moisture.	
					60 3"					
8							6"			
					17					
9					34					
					37					
10										
1										
2										
3										
4										

PROJECT NO 2208 0504

BORING LOCATION

Project: _____
SWMU No. _____
Date Drilled: _____ Date Completed: _____
Logged By: _____

Monitoring Well No.: SB-SD-004
Northing: _____ Easting: _____

Water Elevation (ft.): _____
Date Measured: _____

Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)

Total Depth (ft.): _____
Diameter (in.): _____

Drilling Contractor: _____
Drilling Method: _____

Well Screen: Diameter _____ Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

DEPTH (FEET)	GRAIN SIZE: % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0									silty sand (no gravel)	
1										
2										
3										
4										

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PROJECT NO. 2942.0170

Project:
JMM Boring No.: SB-45-004

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
5		100		0	11			SP	Sample A 13:00 Poorly graded sand, 10YR5/4 Yellowish Brown	
				0	7				Sand Fine to V. Fine, R-SA, low dense, moist to Sl. moist.	
6					11					
7									13:20 Sample B.	
	T				9				Same as above w/ Trace med gravel, and slight	
8				8	11				increase in moisture.	
* grade				22	14					
9					10				same as above.	
				18						
				7	14					
10										
1										
2										
3										
4										

PROJECT NO 2208.0504

BORING LOCATION

Project: TEAD-N
SWMU No. 46
Date Drilled: _____ Date Completed: _____
Logged By: MDL
Water Elevation (ft.): _____
Date Measured: _____
Total Depth (ft.): _____
Diameter (in.): _____

Monitoring Well No.: SB-45-005
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: _____
Drilling Method: _____

Well Screen: Diameter _____ Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0									11:16	
									Asphalt . 3"	
									sandy gravel to gravelly sand, med size gravel	
1										
									o	
2									e	
									Coarse gravel w/ cobbles.	
									cutting have PID Response = 8-10 units	
3										
4										
									Coarse gravel and sand.	

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF ____

PROJECT NO. 2942.0170

Project: TEAD-N SMLRW 45
JMM Boring No.: SB-45-005

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT.	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5									Coarse gravel (minimal sand). Ig Cobble v. slow drilling.	
6					60 2"				~~Begin Sample Collection~~ (not on cobble cant sample. Meet Refusal check auger teeth.	
7					60 1"				Cobbles and Gravel, ↓	
8	60	40	–	0	50		I	GW	Well graded Gravel w/ sand, 10YR 6/3 grayish brown, gravel coarse to med, R-A, sand med to Fine R-SA, High dense, v. sl. moist.	
					60 2"		I		rock blocked sampler.	
9					120 3"		I		rock blocked sampler 13:00	
									v. course Gravel and cobbles. ↓	
10					60 2"		I		~~Cobble~~ blocked sampler.	
11					60 1"		None		~~cobble blocked sample.~~ Cobbles. 13:50	
12	50	50			66 5"		I	50/60	Well graded sand, 10YR 6/3 Pale Brown, Sand med to Fine R-SA, Gravel coarse to med R-SA, High dense V.Sl. Moist, trace Calcareous rip on gravel crust.	
13										
14										

PROJECT NO. 2208.0504

BORING LOCATION

Project:
SWMU No.
Date Drilled: 5/25 Date Completed: 5/25
Logged By:

Monitoring Well No.: 96-4 106
Northing: Easting:

Water Elevation (ft.):
Date Measured:

Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)

Total Depth (ft.):
Diameter (in.):

Drilling Contractor:
Drilling Method:

Well Screen: Diameter Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE: % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
0									Asphalt 2"	
	20	30	50	21				CL/CH	Sandy and Gravelly Lean Clay 10YR 3/2; Fines med to high Plasticity, Sand Coarse to V. Fine R-SA, Gravel Coarse (up to 3-inches) R-SA, Low dense moist, interbedded Gravel and Sand. dark staining in soil.	
1										
2										
3										
4										

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF

PROJECT NO. 2942.0170

Project: _____

JMM Boring No.: SB-45-006

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT.	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5										
								CL-GW	sandy lean clay with increase in gravel.	
6										
7										
								GW	Gravel GW coarse with cobles.	
8									Bottom of Pipe = 8.5'	
	40	60		27	20			SW	Well graded sand with gravel 10YR5/3 brown sand coarse to Fine A-5A, Gravel coarse to ~~fine~~ med	sample A 9:10
9					60 2"				A-1-5A, sl. moist moderate to high descn.	
					40				same as above.	
					60 5"					
10				3.9	27					sample B 9:30
					44					
11					58					
12										
13										
14										

PROJECT NO. 2208.0504

BORING LOCATION

Project: _____
SWMU No. _____
Date Drilled: _____ Date Completed: _____
Logged By: _____

Monitoring Well No.: SB45-007
Northing: _____ Easting: _____

Water Elevation (ft.): _____
Date Measured: _____

Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)

Total Depth (ft.): _____
Diameter (in.): _____

Drilling Contractor: _____
Drilling Method: _____

Well Screen: Diameter _____ Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0									Asphalt 2"	
									logged cuttings.	
	15	30	55	0.0				CL-CH	Sandy lean clay to Sandy Silt Clay w/ gravel 10YR3/2 Dark Grayish Brown, Fines low to High plasticity soft, Sand fine to coarse, R-SA. Gravel med R-SA, V. low density, moist,	
1										
2										
3										
4										

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF ____

PROJECT NO. 2942.0170

Project: _____

JMM Boring No.: SB-45-007

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ATION T)
5										
6										
7										
8										
9		40	60	0	1			CL	Sandy Lean clay 10YR-3/3 dark brown/ Fine low to moderate Plasticity, sand course to V. Fine R-SA,	Samp 11:20
					1				Low density, wet.	Dup
10	30	70		0	10			SW	Well graded sand with gravel 10YR 3/3 brown sand course to fine R-SA, gravel: coarse to	
	40	70			34			SW	medium R-SA, low density moist.	Samp 12:00
11					48				Same as with increase in gravel.	
					58					
12										
3										
4										

PROJECT NO. 2208.0504

BORING LOCATION

Project: _____
SWMU No. _____
Date Drilled: _____ Date Completed: _____
Logged By: _____

Monitoring Well No.: SB ... 208
Northing: _____ Easting: _____

Water Elevation (ft.): _____
Date Measured: _____

Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)

Total Depth (ft.): _____
Diameter (in.): _____

Drilling Contractor: _____
Drilling Method: _____

Well Screen: Diameter _____ Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0									Gravelly Sand.	
1										
									Sand Gravel w/ wood.	
2				4.1						
									large cobbles.	
3									Decrease in cobbles.	
									Gravel to Gravelly Sand.	
4										

PROJECT NO. 2942.0170

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

Project: _____

JMM Boring No.: SB-45-008

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5	60	40		1.6	65			GW	well graded gravel w/ sand, 10YR5/3 brown, gravel coarse to med R-SA, sand coarse to fine R-SA, high dense sl. moist	13:45 SAMPLE #3 SPOON + DUP 361
					60 3"					
6					60 1"		NR		NO Recovery	
	60	40		1.3	45			GW	same as above	
7					60 5"					
									Gravely sand.	
8										
	50	50	TR	0	19			SW/GW	well graded sand w/ gravel to well graded gravel w/ sand, 10YR5/3 brown, sand coarse to v. fine	14:10 Sample B
9					33				R.-SA, gravel coarse to medium, R-SA, moderately dense, sl moist,	
					30					
10										
1										
2										
3										
4										

PROJECT NO. 2208.0504

BORING LOCATION

Project: _____
SWMU No. _____
Date Drilled: _____ Date Completed: _____
Logged By: _____
Water Elevation (ft.): _____
Date Measured: _____
Total Depth (ft.): _____
Diameter (in.): _____

Monitoring Well No.: SS-42-009
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: _____
Drilling Method: _____

Well Screen: Diameter _____ Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0	30	70					50		15:05 Gravely sand.	
1										
2										
3										
4									Gravel with sand and cobbles.	

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF ____

PROJECT NO. 2942.0170

Project: _____

JMM Boring No.: SB-45-004

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICAT.	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5									gravel w/ cobbles.	
6					18				Sandy Gravel 15:15 sample A.	
7	50	50		0	18 26			GW/SW	well graded gravel with sand ~~pale~~ well graded sand with gravel 10YR6/3 ~~pale~~ Brown, gravel	
					26				medium A-5A; sand, coarse to fine, A-5A, moderate dense, sl. moist,	
8					26					
									15:40 Sample B	
9	70	30		0	16			GW	well graded gravel w/ sand; 10YR6/3 pale Brown gravel med, A-5A; sand coarse to v. fine A-5A), mod. Dense, v. sl. moist,	
					22					
10					21					
				0	21				as above	
					23					
11									TD.	
12										
13										
14										

PROJECT NO. 2208.0504

BORING LOCATION

Project: _____
SWMU No. _____
Date Drilled: _____ Date Completed: _____
Logged By: _____

Monitoring Well No.: SB-45-10
Northing: _____ Easting: _____

Water Elevation (ft.): _____
Date Measured: _____

Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)

Total Depth (ft.): _____
Diameter (in.): _____

Drilling Contractor: _____
Drilling Method: _____

Well Screen: Diameter _____ Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

DEPTH (FEET)	GRAIN SIZE: % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
0									sand with gravel	
1										
2										
3										
4									Cobbles - Sandy gravel with cobbles	

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 1

PROJECT NO. 2942.0170

Project:

JMM Boring No.: SB-45-DID

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5	30	70		0	40			SW	well graded sand with gravel, 10YR5/3 brown, Sand V. Fine to Course, R-SA; Gravel, med to	Sample A 9:30
					38				Coarse	
6				0	30				Cobble encountered during drilling. (difficult drilling.	
				0	43					
7									Cobble encounter. Refusal — TD.	
									~~Sample B to 8~~ na MDL	
8										
9										
0										
1										
2										
3										
4										

PROJECT NO. 2208.0504

BORING LOCATION

Project: _____
SWMU No. 45
Date Drilled: 5/27 Date Completed: _____
Logged By: _____
Water Elevation (ft.): _____
Date Measured: _____
Total Depth (ft.): _____
Diameter (in.): _____
Well Screen: Diameter _____ Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

Monitoring Well No.: SB-45-1
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: _____
Drilling Method: _____

DEPTH (FEET)	GRAIN SIZE: % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0									Sandy Gravel with cobbles	
1										
									Gravelly Sand, No cobbles. low dense.	
2										
3										
4										

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

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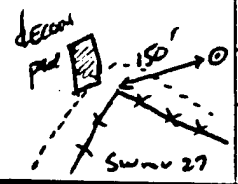
PROJECT NO. 2942.0170

Project:
JMM Boring No.: SB-45-01

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity: density: moisture content: additional facts)	ELEVATION (FEET)
5										
6										
7	30	40	30	MA	17			SM	15:05 *338 Sample A. Well graded ~~Gravelly~~ sand with silt and gravel, 10YR 5/3 brown sand, coarse to V. Fine, R-SA Fine nonplastic,	
	30	40	30	0	17			SM	gravel med, SR-SA, moderate to low dense. V slightly moist.	
8					17 ~~30~~					
					20				15:30 Sample B.	
9	30	40	30	0	16			SM	same as above.	
					60 5"			GW	Well graded gravel with sand, 10YR 5/4 Y. Brown,	
10				0	60 5"				gravel, coarse to medium, R-SA, Sand Fine to coarse, R-SA, High dense, dry, calcareous vein on gravel clasts.	
1										
2										
3										
4										

PROJECT NO 2208 0504

BORING LOCATION



Project: TEAD Phase II
SWMU No. 45
Date Drilled: 6/1/94 Date Completed: _____
Logged By: DKM
Water Elevation (ft.): _____
Date Measured: _____
Total Depth (ft.): 10½'
Diameter (in.): _____

Monitoring Well No.: _____
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: Eatch Inc.
Drilling Method: Hollow-Stem Auger

Well Screen: Diameter _____ Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

SD-45-012

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0									Poorly-graded Sand w/silt; Grayish Brown; moist Loose.	
1								SP-SM		
2										
									Well-graded gravel w/ sand. About 60% fine & coarse sub-rounded gravel; about 30%-40% sand; 10% fines; Non-plastic.	
3								GW		
4										

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

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PROJECT NO. 2942.0170

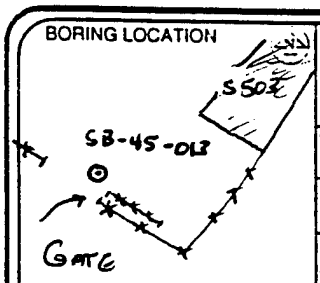
Project: TEAD-N Phase II
JMM Boring No.: SB-45-01B

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5										
6				60 for 2"						
				67					Sample SB-45-01BA (6½'-8½'): Dark Brownish gray (10 YR 4/2) dry to slty. moist well-graded sand w/gravel cl S.lt. About 60% well-graded v.fine to coarse sub-rounded sand; about 30%-40% fine, sub-angular gravel, loose. Strong react. w/HCl. About 10%-15% fines, non-plastic.	
7				42			25%	SW-SM		
				46				SW		
8				32						
				60 for 5"						
9				18					As above. Sample SB-45-01BB (9'-10.5')	
				32			10%		At least 40% gravel-broken fragments.	
10				60 for 5"			50	GW	grading to well-graded gravel & boulder. TD @ 10½'	
11										
2										
3										
4										

PROJECT NO. 2208.0504

SB-45-013

BORING LOCATION



Project: TEAD-N Phase II
SWMU No. 45
Date Drilled: 6/1/94 Date Completed: 11
Logged By: DKK
Water Elevation (ft.):
Date Measured:
Total Depth (ft.):
Diameter (in.):

Monitoring Well No.:
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: EarthTec
Drilling Method: Hollow-Stem Auger

Well Screen: Diameter Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0								A/C covering		
1	50-60	40	<5	0				GW	Brown (7.5 YR 4/2), moist well-graded gravel w/sand; about 50%-60% fine to coarse sub-rounded to angular gravel; about 40% v. fine to coarse well-graded sand, loose, non-plastic. about 5% fines. Occasional cobbles (5%).	
2										
3								GW	As above, less cobbles below 2½'.	
4										

PROJECT NO. 2942.0170

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

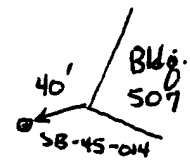
Project: TEAD Phase II

JMM Boring No.: SB-45-013

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5					18		SB-45-013A Dup			
				-0-	60 for 5"		SB-45-013			
6	50-60	40	5-10		43			GW	Yellowish Brown (10YR 5/4), moist well-graded gravel with sand; about 50%-60% fine to coarse sub-rounded to angular gravel; about 40% v.fine to coarse sand, loose.	
				0.1	38				5%-10% fines. Non-plastic. 50% Recovery. Strong HCl reaction.	
7					22					
					32		SB-45-013B			
8					40			GW	Pale to lt. yellowish Brown (10YR 6/3, 6/4) slightly moist well-graded gravel with sand;	
					10		SB-45-013C		50%-60% fine to coarse sub-rounded to sub-angular gravel; 30%-40% v.fine to coarse sand, sub-rounded; loose. About 10% fines, non-plastic.	
9	50-60	30-40	10		21				(40% Recovery) Strong HCl reaction. TD @ 9½'	
									1410 hrs.	
0										
1										
2										
3										
4										

PROJECT NO. 2208.0504

BORING LOCATION



Project: TEAD Phase II
SWMU No. 45
Date Drilled: 6/1/94 Date Completed: _____
Logged By: DK
Water Elevation (ft.): _____
Date Measured: _____
Total Depth (ft.): _____
Diameter (in.): _____

Monitoring Well No.: _____
Northing: _____ Easting: _____
Ground Surface Elevation (ft.): _____
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: Earth Tech
Drilling Method: Hollow Stem Auger

Well Screen: Diameter _____ Depth _____ Slot Size _____
Casing: Diameter _____ Length _____ Type _____
Sand _____ Bentonite Seal _____ Cement Grout Seal _____

SB-45-014

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0			N/A						A/C Covering	
1									Brown, well-graded gravel with sand, moist. 60% fine to coarse, sub-rounded gravel; 30%-40% v.fine to coarse, well-graded sand, loose. 5%-10% fines, non-plastic. STRONG HCl reaction.	
2								GW	Probably drilling in backfill here.	
3									As Above (1' - 2').	
4										

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 2

PROJECT NO. 2942.0170

Project: TEAD Phase II

JMM Boring No.: SB-45-014

DEPTH (FEET)	% GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USC name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)
5									As above
6					12				
					16				only 5% sample recovery 6-7½'.
7					26				
					100			GW	
8	60	30	10	—	45		SB-45-014A		Brown (7.5 YR 5/3) well-graded gravel with sand; 60%-65% fine to coarse, sub-rounded gravel, loose.
					60 for 5"		SB-45-014B		30% v. fine to coarse sand, 5%-10% fines, non-plastic. Cobbles. Strong HCl reaction
9					24		SB-45-014C		As above, but more grayish Brown (2.5Y 5/2).
					40				60% Sample recovery
10					78		SB-45-014D		TDE 10½'
11									
12									
13									
14									

ELEVATION (FT)

PROJECT NO.

BORING LOCATION

Project: TEAD-N Phase II RFI
SWMU No. 45
Date Drilled: 6/8 Date Completed: ____
Logged By: JCK
Water Elevation (ft.): ____
Date Measured: ____
Total Depth (ft.): ____
Diameter (in.): ____
Well Screen: Diameter ____ Depth ____ Slot Size ____
Casing: Diameter ____ Length ____ Type ____
Sand ____ Bentonite Seal ____ Cement Grout Seal ____

Monitoring Well No.: ____
Northing: ____ Easting: ____
Ground Surface Elevation (ft.): ____
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor: ____
Drilling Method: ____

SB-45-015

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0										
1										
2	50-65%	30-40%	10%					GW	Brown, dry to slty. moist, well-graded gravel w/sand; about 50%-65% fine to coarse, sub-rounded to rounded gravel, loose. About 30%-40% well-graded sand; 10% fines, non-plastic.	
3									As above; more cobble size below 3½'.	
4										

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 2

PROJECT NO. 2942.0170

Project: _____

JMM Boring No.: _____

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5										
6									As above	
7								GW		
8									TD = 8'	
									Sample SB-45-015 A	
9										
0										
1										
2										
3										
4										

PROJECT NO. 2208.0504

OLD DISPENSARY DISCHARGE - BUILDING 400
(SWMU 48)

SOIL BORING LOGS

BORING LOCATION

Project:
SWMU No. 48
Date Drilled: 5/27 Date Completed: 6/9/94
Logged By:
Water Elevation (ft.):
Date Measured:
Total Depth (ft.):
Diameter (in.):
Well Screen: Diameter Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

Monitoring Well No.: SB 48-101
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor:
Drilling Method:

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0									At out Fall 1' away.	
									8:10 Sample A.t Dup.	
		50	50		4			SM/ML	silt Sand to Sandy Silt 10YR 5/3 brown, sand Fine to V. Fine, A-SA, Fines, nonplastic, Dry.	
1				5	6					
				8	7					
2					8				Same as above with 10-15% Black root carbon staining throughout sample interval.	
					7					
3					5					
4									Cobbles encountered. refusal on all three attempts.	

* C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PROJECT NO. 2942.0170

Project: HA

JMM Boring No.: SB48-001

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name: color: size and angularity of each component or plasticity; density: moisture content: additional facts)	ELEVATION (FEET)
5									6/19/94 Completion. Very Coarse Gravel with Cobbles.	
6										
7	60	40		0.0	30			GW	well graded gravel w/ sand, 10YR6/2, light grayish brown, gravel coarse to medium, R-6A, sand coarse to fine	
8				0.0	31				R-6A, moderately dense, slightly moist.	
9	60	40		0.0	48			GW	Same as above.	
10					32					
1					39					
2										
3										
4										

PROJECT NO. 2208.0504

BORING LOCATION

Project:
SWMU No. 45
Date Drilled: 5/27 Date Completed:
Logged By:
Water Elevation (ft.):
Date Measured:
Total Depth (ft.):
Diameter (in.):
Well Screen: Diameter Depth Slot Size
Casing: Diameter Length Type
Sand Bentonite Seal Cement Grout Seal

Monitoring Well No.: SD 4: 02
Northing: Easting:
Ground Surface Elevation (ft.):
Measuring Point is Ground Surface
Datum: NGVD (1929)
Drilling Contractor:
Drilling Method:

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE*	SAMPLE RECOVERY	USCS CLASSIFICATION	LITHOLOGIC DESCRIPTION (USCS name: color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
0										
	15	50	35						Silty Sand w/ Gravel, 10YR 5/4 Y. Brown, sand med to Fine A-SA, fines nonplastic, Gravel, medium. A-SA. low dense, v. sl. moist.	
1									~~Sample A.~~	
2				0	6				Sample A 10:05 same as above but moist.	
					4					
3				6	3					
4									Cobbles	
									gravelly Sand to Sandy gravel course.	

*C California Split Spoon Sampler (2.5" I.D.)
S Standard penetration test sampler
c Cuttings
▼ Elevation of ground water

MONTGOMERY WATSON

TEAD-N PHASE II RFI
SOIL BORING LOG

PAGE 1 OF 2

PROJECT NO. 2942.0170

Project:

JMM Boring No.: SB-48-002

DEPTH (FEET)	GRAIN SIZE % GRAVEL	% SAND	% FINES	MAX. PID READING (ppm)	BLOWS (6 IN.)	SAMPLE TYPE	SAMPLE RECOVERY	USCS CLASSIFICAT	LITHOLOGIC DESCRIPTION (USC name; color; size and angularity of each component or plasticity; density; moisture content; additional facts)	ELEVATION (FEET)
5					60/3"			GW	cobble blocked sampler no recovery	
									Sandy Gravel w/ cobbles. Very cuff - couldn't get SS sample.	
6										
7					60/2"		I		No recovery.	
									Sample 10:45	
8	70	20	10		35		I	GW	well graded gravel with sand 10YR5/3 brown, gravel course to med R-A, Sand coarse to V. Fine, R-S; Fines nonplastic, sl. moist, high density	
				9	60/4"				same as abbve.	
9					57					
				18	70/5"				same as above.	
10					60/4"					
1										
2										
3										
4										

PROJECT NO. 2208.0504

APPENDIX C

MONITORING WELL INSTALLATION, DEVELOPMENT, AND PERMEABILITY TEST DATA

C.1 INTRODUCTION

C.1.0.1. This appendix describes the materials and procedures used to construct, develop, and conduct formation permeability tests at the two new monitoring wells (N-142-93 and N-143-93) at the Stormwater Discharge Area (SWMU 45) during the Phase II RFI. This appendix also contains well completion logs, well development records, and data from the slug tests of these two wells. The procedures and documentation for the groundwater analytical sampling are presented in Appendix D.

C.1.0.2. The scope of the Phase II groundwater investigation at SWMU 45 consisted of the following:

- Drill and construct two new, approximately 350 feet deep, monitoring wells at SWMU 45: one upgradient and one downgradient of the stormwater discharge pond
- Develop each well within approved USEPA and Army guidance
- Conduct permeability (slug) tests at each of the new monitoring wells
- Collect two rounds of groundwater samples from these new wells, and at an existing monitoring well further downgradient from the discharge pond.

C.1.0.3. The forms in this appendix are arranged as follows:

Form	Page
Monitoring Well Installation Data Record	C-5 to C-6
Well Development Record	C-7 to C-9
Slug Test Data	C-10 to C-19

C.2. MONITORING WELL INSTALLATION PROCEDURES AND MATERIALS

C.2.1. Monitoring Well Installation Procedures

C.2.1.1. Monitoring well borings were advanced approximately 15-feet into the water table prior to beginning well construction. Using the air rotary drilling technique in a permeable aquifer, the location of the water table was determined by advancing the drill rods until groundwater was seen in the cuttings discharge. At this time, an electric water level tape measure was used to directly measure standing water inside the drill pipe. Wells were constructed inside the dual-wall drill pipe to prevent the formation from collapsing into the borehole during construction activities. The well screen and riser pipe were lowered down the borehole using a cable-winch on the drill rig, adding each 10-foot joint of pipe individually. Once the well screen and casing were set in the borehole, filter pack sand was added. The sand was placed by pouring between the annulus of the well casing and drill casing, while its thickness was gauged with a weighted tape. Sand was placed to approximately 5 feet above the top of the screen. A minimum five-foot thick bentonite seal was placed above the filter pack in the same manner. The remainder of the annulus was filled with grout. Grout was poured directly down the inside of the drill pipe, which was pulled up and removed at a rate slightly slower than that of the rising grout, serving as a tremie pipe. Grouting of each well was completed in three to four lifts to minimize the likelihood of casing collapse or grout intrusion into the well screen due to the weight and/or heat build-up from a large column of curing grout. Each well was completed as a stick-up by setting a steel protective casing in concrete over the well, surrounded by four bumper posts. The surface completion followed USAEC Geotechnical Requirements, including painting the protective casing orange with the well designation painted in white letters, secured with a padlock keyed like all other TEAD-N monitoring wells. Specific quantities and measurements are provided on the Monitoring Well Installation Data Record forms, which follow. Completed and signed bentonite and filter pack approval forms are included in Appendix M.

C.2.1.2. No grout bridging or intrusion were noted during construction of monitoring well N-142-93, nor any other problems except the accidental breaking of the well casing about 25 to 30 feet bgs. This was subsequently repaired, and the repairs confirmed by video taping with a down-hole camera. The pH of the initial purge water evacuated during development activities at N-142-93 did not indicate the presence of grout in the well screen; in fact, the initial pH was slightly low compared to subsequent

measurements (see the well development record sheets included in Appendix C). During the initial sampling and pump testing at N-142-93, a slight bend in the well casing was noted while lowering the pump and attached transducer into the well, but this occurred at a depth well below the depth of the construction problems mentioned. This is not unusual in a 4-inch well of this depth when lowering a 3-inch pump and attached instrumentation, which can total 4-5 feet in length.

C.2.2. Monitoring Well Construction Materials. The following materials were used in the construction of each well:

- Type 304 stainless-steel well screen manufactured by the Howard Smith Screen Company. Each well was constructed with 20 feet of 0.020 slot, four-inch inside diameter screen (as specified in the Final Project Work Plans for the Phase II RFI; Montgomery Watson, 1993). Screen was supplied in 10-foot lengths, and was connected with threaded joints. A four-inch long, threaded end cap was used at the bottom of the well screen.

- Schedule 40 PVC riser pipe manufactured by Campbell-Monoflex. All well casing (riser pipe) was four-inch inside diameter, ten-foot lengths connected with threaded joints.

- Type 10-20 silica sand manufactured by Colorado Silica Sand was used as filter pack material.

- Enviroplug 1/4-inch bentonite tablets manufactured by Wyo-Ben, Inc. were used as a seal immediately above the filter pack.

- Grout consisting of an approximate 20:1 ratio of Type I-II low alkali Portland cement and Enviroplug bentonite, mixed with water from the approved water source, was used to fill the annulus above the bentonite seal to within three-feet of the ground surface.

- An eight-inch diameter steel, locking, protective stick-up casing with four bumper posts, all set in concrete.

C.3 WELL DEVELOPMENT PROCEDURES

C.3.0.1. Between two and seven days following completion, each well was developed using a combination of bailing and pumping techniques. Sediment was removed and the well was surged using a stainless steel bailer on a smeel-type pump rig. After enough sediment had been removed by bailing to allow efficient pump operation, each well was evacuated with a submersible stainless steel pump until the turbidity was less than five nephelometric units (NTUs) and a minimum of five times the saturated borehole volume of water had been removed. Development water was contained and subsequently discharged at the TEAD-N IWTP.

C.3.0.2. Groundwater level measurements were taken during development of each well and recorded on the Well Development Record forms included in this appendix. A total of 855 gallons of water were removed from N-142-93 during development. Initially, 280 gallons were bailed and pumped from the well on October 24 and 25, 1993. An additional 575 gallons were bailed and pumped on November 7, 1993 to complete well development. The final values of the groundwater measurements included a turbidity of less than 5 NTUs, pH of 7.15, specific conductivity of 2270 µmhos, and a temperature of 14.4°C. Well N-143-93 was developed on November 8, 1993, when 600 gallons of water were removed through a combination of bailing and pumping techniques. The turbidity reached a value less than 5 NTUs, with a pH of 6.82, specific conductivity of 2050 µmhos, and a temperature of 13.9°C.

C.4 FORMATION PERMEABILITY TESTING (SLUG TESTS)

C.4.0.1. Slug withdrawal tests were performed in wells N-142-93 and N-143-93 in conjunction with the first water sampling round on November 22 and 23, 1993. Slug withdrawal tests are performed by rapidly removing a known volume of water (slug) from each well, then measuring the water-level recovery until the static water level is reached. These data are used to calculate hydraulic conductivity (K) of the hydrostratigraphic unit that is intercepted by the well screen.

C.4.0.2 Slug Test Procedures. The slug tool consisted of a 1-inch diameter stainless steel rod, which displaced one gallon of water. The slug tool was submerged below the water surface of each well, suspended by a stainless steel cable on the smeel rig. A pressure transducer was also submerged in the well to detect changes in the water level. Once the water level had stabilized after submerging the slug tool, the tool was rapidly

removed from the well, and the subsequent water level recovery measured and recorded by the pressure transducer and a Hermit data logger. All equipment used inside each well was decontaminated prior to use and between wells to prevent the introduction of contamination to the monitoring wells.

C.4.0.3. Data Interpretation. Test data were downloaded from the data logger to a computer disc and analyzed using the AQTESOLV computer program (Gerachty and Miller, 1991). The Bouwer and Rice method for unconfined aquifers was used to calculate K for each well (Bouwer and Rice, 1976). Monitoring wells N-142-93 and N-143-93 yielded K of 0.1155 ft/min and 0.0834 ft/min, respectively. Raw data from the data logger and graphical plots of the data along with the Ks generated with AQTESOLV are included in this appendix (pages C-10 to C-19). Converting the units of K from ft/min to cm/sec yields values of 0.0587 cm/sec and 0.0424 cm/sec respectively for N-142-93 and N-143-93. These are typical values for the silty, sandy, gravels (Freeze and Cherry, 1979) that were encountered within the screened interval of each well.

TEAD—North Area

Project *Phase II RFI—TEAD-N*

Well No. *N-143-93*

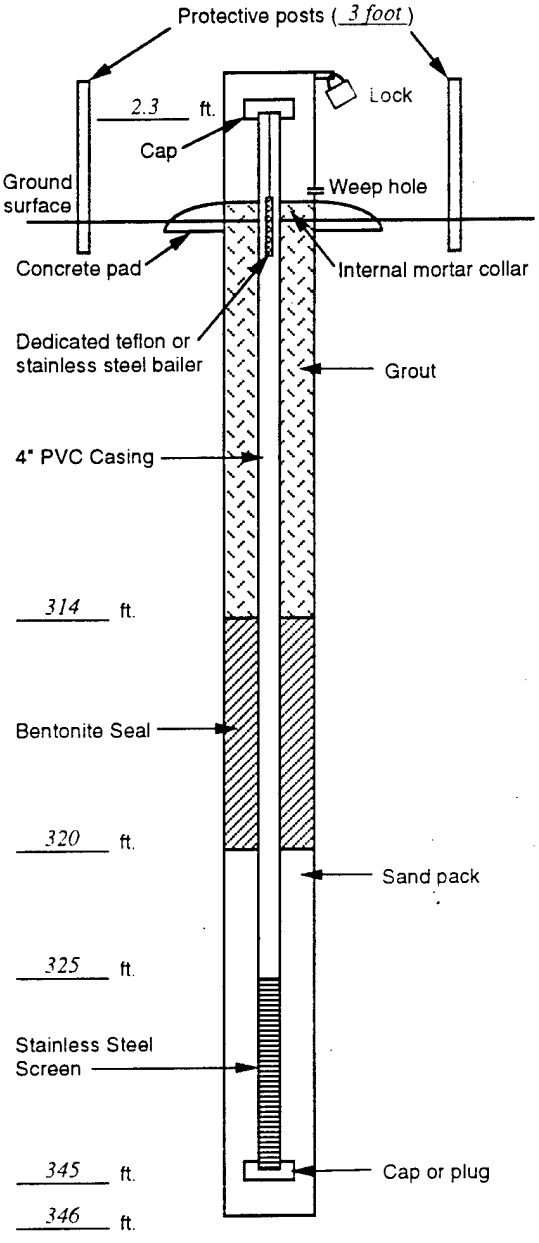
SWMU No. *45*

Boring *N-143-93*

Field Geologist *Brian Hamos*

Installation Date *10-27-93*

Checked by _____



Not to scale

Measuring point is ground surface unless otherwise noted.

Drilling Summary

Total depth *346* feet

Borehole diameter *9* inches

Drilling company *Layne Environmental*

Driller *Jim Sine*

Helpers *Blaine Wright, Chris Davis*

Rig *Becker*

Method *Percussion Hammer*

Well Construction Materials

Grout

Quantity *26 Fifty-lb. bags bentonite*
185 Ninty-four lb. bags cement

Type *Type I-II low alkali Portland cement*
Enviroplug bentonite powder

Filter Pack

Quantity *16 one hundred-lb bags*

Sand type *10-20 Colorado silica sand*

Bentonite

Quantity *3 1/2 Five-gallon buckets*

Pellet size *1/4 inch*

Screen

Length *20 Feet*

I.D. *4 Inches*

Slot size *.020*

Type *Stainless Steel*

Schedule (casing) *304 Stainless*

Initial water level *316* feet

Comments _____

PROJECT NO. *2942.0190*

TEAD-N PHASE II RFI
MONITORING WELL
INSTALLATION DATA RECORD

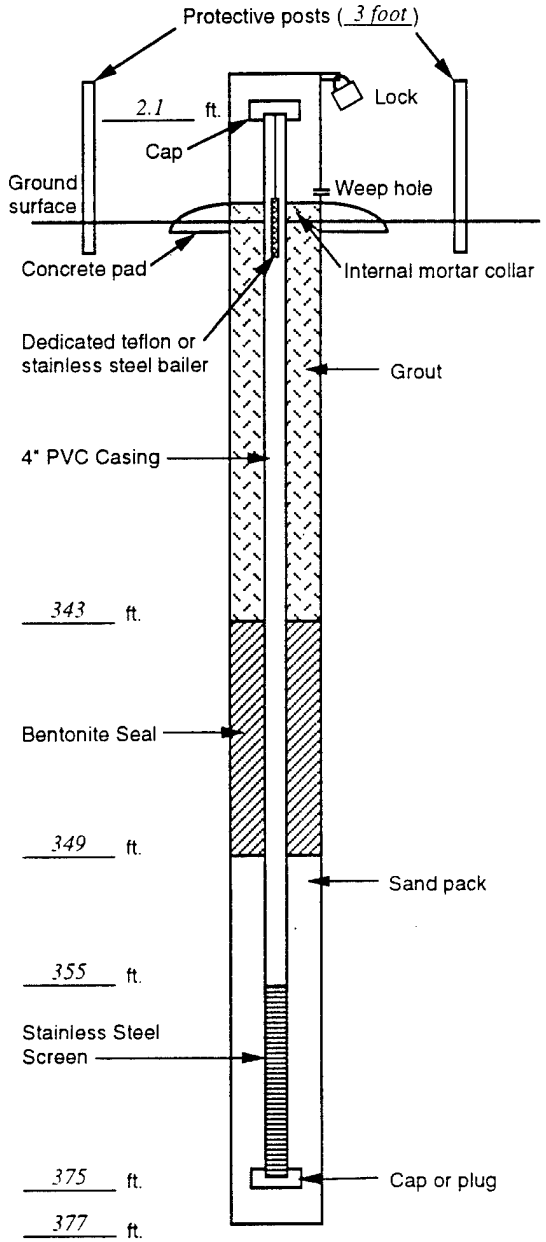
TEAD—North Area

Project *Phase II RFI—TEAD-N* **Well No.** *N-142-93*

SWMU No. *45* Boring *N-142-93*

Field Geologist *Brian Hamos* Installation Date *10-10-93*

Checked by _____



Not to scale

Measuring point is ground surface unless otherwise noted.

Drilling Summary

Total depth *377* feet

Borehole diameter *9* inches

Drilling company *Layne Environmental*

Driller *Jim Sine*

Helpers *Blaine Wright, Chris Davis*

Rig *Becker*

Method *Percussion Hammer*

Well Construction Materials

Grout

Quantity *20 Fifty-lb. bags bentonite*
111 Ninty-four lb. bags cement

Type *Type I-II low alkali Portland cement*
Enviroplug bentonite powder

Filter Pack

Quantity *9 one hundred-lb bags*

Sand type *10-20 Colorado silica sand*

Bentonite

Quantity *2 1/4 Five-gallon buckets*

Pellet size *1/4 inch*

Screen

Length *20 Feet*

I.D. *4 Inches*

Slot size *.020*

Type *Stainless Steel*

Schedule (casing) *304 Stainless*

Initial water level *352* feet

Comments _____

PROJECT NO. *2942.0190*

TEAD-N PHASE II RFI
MONITORING WELL
INSTALLATION DATA RECORD

TEAD-N RFI PHASE II
WELL DEVELOPMENT RECORD
Montgomery Watson

Installation Date(s) October 10-15, 1993 | SWMU No. 45

WELL NAME N'-142-93 Location TEAD-N', Sumu. 45 Personnel D. Koepke, D. Potts

Date 10-22-93, 10-24-93 Weather Clear, Sea-breeze, 5 mph Well completion height 2.1 feet

MEASUREMENT SUMMARY: SCREEN LENGTH = 20 feet STAINLESS STEEL (355' - 375' bgs)

Well Diameter: 4" I.D. PVC Total casing depth (installed) 377' bgs Total measured depth ____

Initial depth to water 350.21' Time 0940 Measuring point TOC Depth of product N/A

Final pH 7.50 Final SC 223 Final Temp(°C) 14.4° Final Turbidity ____

PURGE VOLUME CALCULATIONS:

Casing Volume = $V_c = \pi r^2 h = (3.1415)(0.167\ ft)^2 h = 0.088\ ft^3/ft$ of ht (for 4" I.D. casing)

Annular Volume = $V_a = \pi(0.417)^2 - \pi(0.167\ ft)^2 = 0.546 - 0.088 = 0.458\ ft^3/ft$ (for 10" borehole)

Total Volume = $V_t = 0.458(0.3) + 0.088 = 0.138 + 0.088 = 0.225\ ft^3 H_2O/ft$ of height

$0.225\ ft^3 \times \frac{7.48\ gal}{ft^3} = 1.68$ gal H_2O per foot of H_2O column height. H_2O Column = $27\ ft \times 1.68 \times 5 = 227$ gal

Post-development depth to water: 350.03' TOC Date 10-25-93 Time 1600

SAMPLING SUMMARY: 5' STAINLESS STEEL 3½"

Casing evacuated with: Dedicated Pump ____ Portable Submersible Pump ✓ Bailer ✓ (2.5 gal)

(Grundfos RDC 16 3½" pump)

Pump Started at ____ Stopped at ____ Total gallons ____

Time	pH	SC	Temp	Turbidity (NTUs)	Volume removed (gal.)	Comments
0950	6.80	2400 umhos	13.4°	> 500	Initial	Light brown, turbid.
1110	8.10	2160 "	13.1°	> 500	40 gals	" " "
~	90	minute	develop. Break	(1130 - 1300) ~	place pump. ~	
~	(	Continue	development	10-24-93)	~	
1045	7.13	2240 umhos	13.5°	> 500	20 gals	Cloudy, brownish
1103	7.04	2190	14.1°	55	≈ 75 gals	clearing up, slightly cloudy
1135	6.94	227.0	14.7°	12	≈ 150 gals	Clear to eye
		(Switch	to	13'	bailer)	
1400	7.35	222.0	14.4°	> 500	≈ 180 gals	Light brown, opaque
1440	7.74	223.0	14.3°	> 500	≈ 230 gals	" " "
1515	7.50	223.0	14.4°	> 500	≈ 280 gals	Lt. brown, cloudy

INSTRUMENTATION: pH Meter Horiba U-10 water Quality Checker Calibration Buffers: 4 ☒ 7 ☐ 10 ☐

Specific Conductivity Meter " Calibrated with standard solution 456 umhos/cm

Turbity Meter " Calibration standard 0.0 NTUs

PR NO. 2942.0170

TEAD-N RFI PHASE II
WELL DEVELOPMENT RECORD
Montgomery Watson

Installation Dates October 10-15, 1993

SWMU No. 45

WELL NAME N-142-93 Location TEAD-N, SWMU 45 Personnel D. Krupicka, D. Platts

Date 11-7-93 Weather Clear, 49°F. Wind Well completion height 2.1 FEET

MEASUREMENT SUMMARY:

SCREEN LENGTH = 20' STAINLESS STEEL (355'-375')

Well Diameter: 4" I.D. PVC Total casing depth (installed) 375' (w/ SCREEN) Total measured depth _____

Initial depth to water 349.58' Time 0905 Measuring point TOC Depth of product N/A

Final pH 7.15 Final SC 2270 Final Temp(°C) 14.4° C. Final Turbidity 4 NTU

PURGE VOLUME CALCULATIONS:

SEE PAGE 1 (10-23-93)

1.68 Gal PER foot of water Column HEIGHT = 1.68 x 25 ft. = 42 Gallons

42 Gallons x 5 volumes = 210 Gallons MINIMUM PURGE

Post-development depth to water: 349.66' TOC Date 11-8-93 Time 1435

SAMPLING SUMMARY:

Casing evacuated with: Dedicated Pump _____ Portable Submersible Pump ✓ Bailer 13' st. steel

Pump Started at 1315 Stopped at 1420 Total gallons (Grundfos 10E 16 3½" pump) ~~425~~ 50 gal (pump) + 50 gal (bailer) = 575 GALLONS Volume

Time	pH	SC	Temp	Turbidity (NTUs)	removed (gal.)	Comments
0935	6.89	2350 umhos	12.9°C	550	Initial	slightly cloudy - NO odor.
1025	6.85	2350	12.6°	>999	90 gal.	Lt. Brown, opaque.
1115	8.25	2270	12.3°	>999	150 gal.	clearing, less opaque
		(place Grundfos Pump @ 1245)				0
1320	6.93	2290	14.4°	435	Initial pumping (=20 gals)	LT. Green, cloudy.
1326	6.85	2290	14.6°	62	70 gal.	clearing well
1340	6.80	2300	14.7°	9	160 gal.	clear to EYE.
1350	6.73	2290	14.9°	7	240 gal.	"
1356	7.10	2280	14.5°	5	280 gal.	"
1405	7.15	2280	14.3°	6	350 gal.	", (after lowering Pump)
1415	7.15	2270	14.4°	4	425 gal.	"
		CEASED pumping @			1420 hrs.	TOTAL 575 gallons

INSTRUMENTATION: pH Meter Horiba U-10 Water Quality Checker Calibration Buffers: 4 ☒ 7 ☐ 10 ☐

Specific Conductivity Meter " Calibrated with standard solution 450 umhos/cm

Turbity Meter " Calibration standard 0.0 NTUs

NO. 2942.0170

PR

TEAD-N RFI PHASE II
WELL DEVELOPMENT RECORD
Montgomery Watson

Installation Dates: 20 October – 5 November, 1993

SWMU No. 45

WELL NAME N-143-93 Location TEAD-N SWMU 45 Personnel D. Krupicka

Date 11-8-93 Weather clear, 32°-50° F. Well completion height 2.6' (TOC)

SCREEN LENGTH = 20' (325'-345' bgs)

MEASUREMENT SUMMARY:

Well Diameter: 4" I.D. PVC Total casing depth (installed) 325' Total measured depth 346' (347.5' TOC)

Initial depth to water ~~331' bgs~~ 319.75' Time 0900 Measuring point TOC Depth of product N/A

Final pH 6.82 Final SC 2050uM Final Temp(°C) 13.9° Final Turbidity 3 NTU.

PURGE VOLUME CALCULATIONS:

Casing Volume = $V_c = \pi r^2 h = (3.1415)(0.167\ ft)^2 h = 0.088\ ft^3/ft$ of ht. (4" casing)

Annulus Volume = $V_a = \pi(0.417)^2 - \pi(0.167)^2 = 0.546 - 0.088 = 0.458\ ft^3/ft$ of ht (10" borehole)

Total Volume = $V_t = (0.458)(0.3) + 0.088 = 0.138 + 0.088 = 0.225\ ft^3/ft$ of ht

$0.225 \times \frac{7.48\ gal}{ft^3} = 1.68$ gal. of H_2O per foot of water Column in well. H_2O Column = 27.75 ft. x 1.68 x 5 = 233.99

Post-development depth to water: Date Time

SAMPLING SUMMARY:

Casing evacuated with: Dedicated Pump ____ Portable Submersible Pump ✓ Bailer ✓

Pump Started at 1517 Stopped at 1617 Total gallons 175 (Grundfos 10E16) Bailer 600 pump } 775 gal. 5' (3½" dia.) ST. STEEL

10 GPM

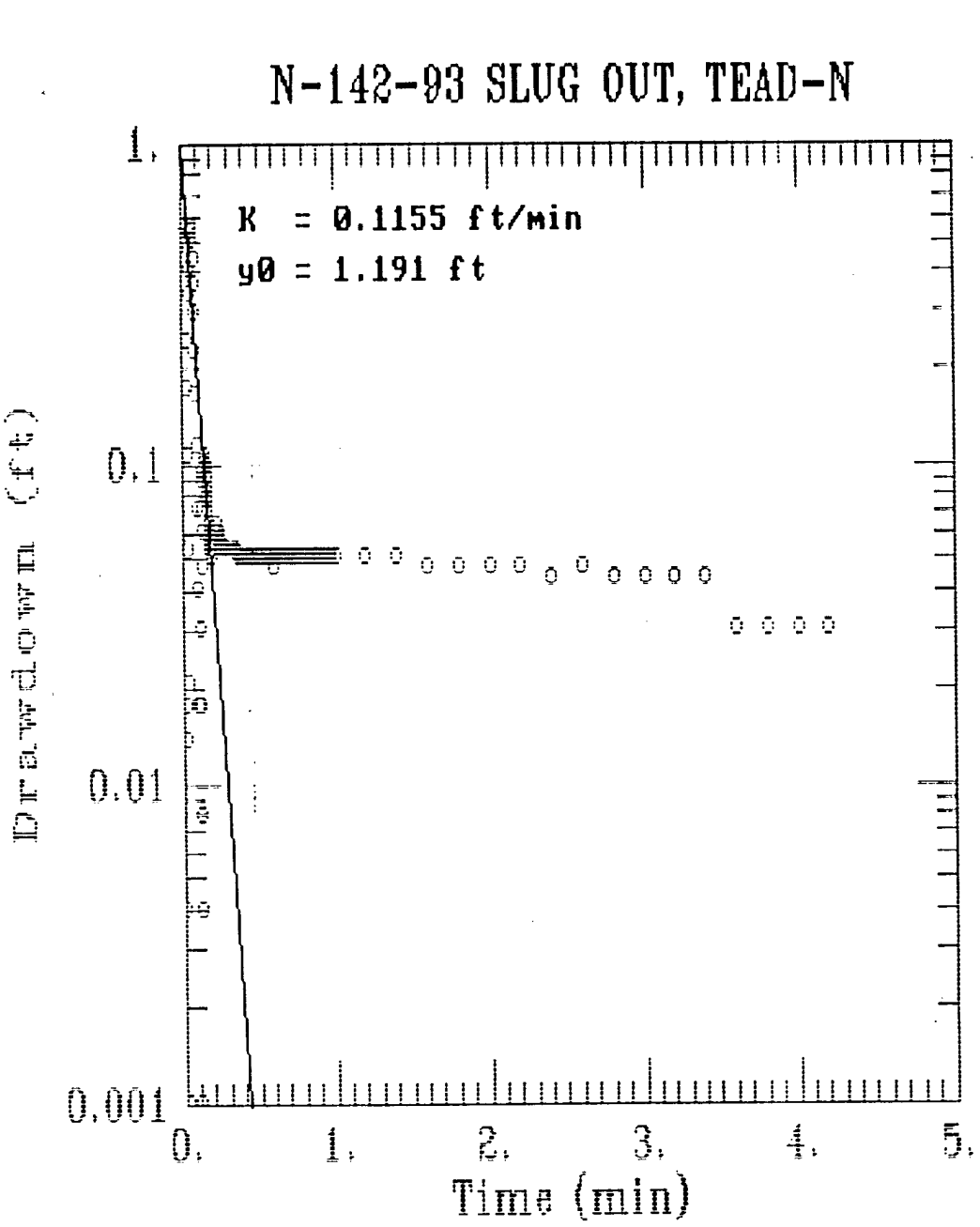
Time	pH	SC	Temp	Turbidity (NTUs)	Volume removed (gal.)	Comments
		Bailing	w/5'	Bailer		
1025	7.28	2080uM	13.6°C.	>999	Total (5gal.)	"Chocolate Brown" - abund. Sand
1150	7.17	2070uM	15.C°	>999	75 gals.	LT. TAN w/ Abund. Sand
1400	7.20	1900	14.0°	900	165 gals.	LT. TAN, clearing
		Pumping	w/ Grundfos	10E16 Pump		
1520	7.19	1880	14.1°	960	20 gal.	Lt. Brown, cloudy
1523	6.90	1940	14.1°	134	60 gal.	clearing
1536	7.10	2020	14.0°	38	200 gal.	"
1546	7.10	2020	13.9°	24	280 gal.	clear to eye
1554	7.03	2030	13.8°	11	370 gal	"
1602	7.06	2060	13.7°	30	450 gal.	"
1613	6.80	2050	13.9°	4	560 gal	"
1617	6.82	2050	13.9°	3	600 gal.	"

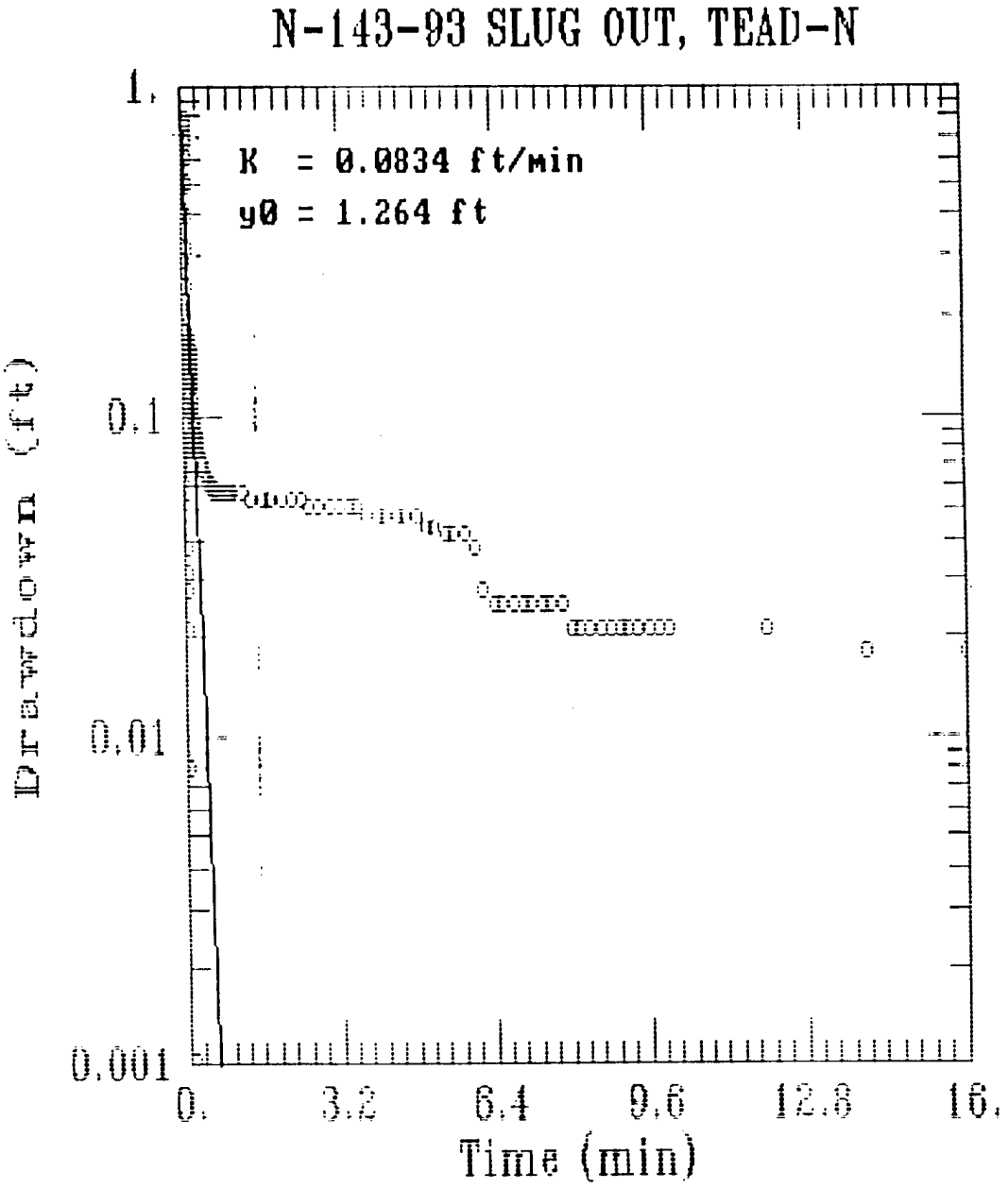
INSTRUMENTATION: pH Meter Horiba U-10 "Water Quality Checker" Calibration Buffers: 4 ☑ 7 ☐ 10 ☐

Specific Conductivity Meter " Calibrated with standard solution ____ umhos/cm

Turbity Meter " Calibration standard 0.0 NTUs

PR . NO. 2942.0170


N-142-93 SLUG OUT, TEAD-N
K = 0.1155 ft/min
y0 = 1.191 ft
1.
0.1
0.01
0.001
0.
1.
2.
3.
4.
5.
Time (min)
Drawdown (ft)


N-143-93 SLUG OUT, TEAD-N
K = 0.0834 ft/min
y0 = 1.264 ft
Drawdown (ft)
1.
0.1
0.01
0.001
0.
3.2
6.4
9.6
12.8
16.
Time (min)

SE1000C
Environmental Logger
11/25 15:27

Unit# 00515 Test 3

INPUT 1: Level (F) TOC

Reference	0.000
Scale factor	10.040
Offset	-0.020

Step 0 11/23 11:33:10

Elapsed Time	INPUT 1
0.0000	-0.057
0.0033	-0.080
0.0066	-0.073
0.0100	-0.121
0.0133	-0.302
0.0166	0.083
0.0200	0.087
0.0233	0.003
0.0266	0.080
0.0300	0.087
0.0333	0.087
0366	0.110
.0400	0.127
.0433	0.124
0.0466	0.151
0.0500	0.154
0.0533	0.000
0.0566	-0.020
0.0600	-0.020
0.0633	-0.030
0.0666	-0.026
0.0700	-0.013
0.0733	-0.050
0.0766	-0.037
0.0800	-0.026
0.0833	0.020
0.0866	0.060
0.0900	0.154
0.0933	0.238
0.0966	0.352
0.1000	0.452
0.1033	0.553
0.1066	0.643
0.1100	0.714
0.1133	0.721
0.1166	0.684
.1200	0.620
.1233	0.536

0.1266	0.442
0.1300	0.345
0.1333	0.261
1366	0.188
.1400	0.124
0.1433	0.077
0.1466	0.047
0.1500	0.023
0.1533	0.013
0.1566	0.010
0.1600	0.016
0.1633	0.030
0.1666	0.043
0.1700	0.060
0.1733	0.077
0.1766	0.087
0.1800	0.104
0.1833	0.107
0.1866	0.114
0.1900	0.114
0.1933	0.114
0.1966	0.107
0.2000	0.100
0.2033	0.090
0.2066	0.080
0.2100	0.073
0.2133	0.063
0.2166	0.053
.2200	0.047
.2233	0.040
0.2266	0.033
0.2300	0.030
0.2333	0.030
0.2366	0.030
0.2400	0.030
0.2433	0.030
0.2466	0.033
0.2500	0.033
0.2533	0.036
0.2566	0.040
0.2600	0.040
0.2633	0.040
0.2666	0.040
0.2700	0.040
0.2733	0.040
0.2766	0.040
0.2800	0.040
0.2833	0.036
0.2866	0.036
0.2900	0.033
0.2933	0.030
0.2966	0.026
0.3000	0.026
0.3033	0.026
.3066	0.023

0.3100	0.023
0.3133	0.020
0.3166	0.020
3200	0.020
.3233	0.020
0.3266	0.020
0.3300	0.020
0.3333	0.020
0.3500	0.020
0.3666	0.016
0.3833	0.013
0.4000	0.013
0.4166	0.010
0.4333	0.010
0.4500	0.010
0.4666	0.006
0.4833	0.006
0.5000	0.006
0.5166	0.003
0.5333	0.003
0.5500	0.003
0.5666	0.003
0.5833	0.003
0.6000	0.003
0.6166	0.003
0.6333	0.003
0.6500	0.000
0.6666	0.000
6833	0.000
7000	0.000
0.7166	0.000
0.7333	0.000
0.7500	0.000
0.7666	0.000
0.7833	0.000
0.8000	0.000
0.8166	0.000
0.8333	0.000
0.8500	0.000
0.8666	0.000
0.8833	0.000
0.9000	0.000
0.9166	0.000
0.9333	0.000
0.9500	0.000
0.9666	0.000
0.9833	0.000
1.0000	0.000
1.2000	0.000
1.4000	-0.003
1.6000	-0.003
1.8000	-0.003
2.0000	-0.003
2000	-0.003
4000	-0.003

2.6000	-0.006
2.8000	-0.006
3.0000	-0.006
.2000	-0.006
.4000	-0.006
3.6000	-0.006
3.8000	-0.010
4.0000	-0.010
4.2000	-0.010
4.4000	-0.010
4.6000	-0.010
4.8000	-0.010
5.0000	-0.013
5.2000	-0.013
5.4000	-0.016
5.6000	-0.016
5.8000	-0.016
6.0000	-0.020
6.2000	-0.030
6.4000	-0.033
6.6000	-0.033
6.8000	-0.033
7.0000	-0.033
7.2000	-0.033
7.4000	-0.033
7.6000	-0.033
7.8000	-0.033
8.0000	-0.037
.2000	-0.037
.4000	-0.037
8.6000	-0.037
8.8000	-0.037
9.0000	-0.037
9.2000	-0.037
9.4000	-0.037
9.6000	-0.037
9.8000	-0.037
10.0000	-0.037
12.0000	-0.037
14.0000	-0.040
16.0000	-0.040

END

SE1000C
Environmental Logger
11/25 15:36

Unit# 00515 Test 0

INPUT 1: Level (F) TOC

Reference	0.000
Linearity	0.450
Scale factor	10.040
Offset	-0.020
Delay mSEC	50.000

Step 0 11/22 15:42:59

Elapsed Time	INPUT 1
0.0000	-0.849
0.0033	-0.846
0.0066	-0.856
0.0100	-0.863
0.0133	-0.856
0.0166	-0.849
0.0200	-0.853
0.0233	-0.832
0.0266	-0.836
0300	-0.836
.0333	-0.829
0.0366	-0.795
0.0400	-0.744
0.0433	-0.673
0.0466	-0.605
0.0500	-0.510
0.0533	-0.439
0.0566	-0.368
0.0600	-0.321
0.0633	-0.294
0.0666	-0.280
0.0700	-0.287
0.0733	-0.304
0.0766	-0.345
0.0800	-0.409
0.0833	-0.480
0.0866	-0.551
0.0900	-0.622
0.0933	-0.683
0.0966	-0.734
0.1000	-0.778
0.1033	-0.809
0.1066	-0.832
0.1100	-0.842
0.1133	-0.846
.1166	-0.842

0.1200	-0.832
0.1233	-0.819
0.1266	-0.802
1300	-0.788
.1333	-0.775
0.1366	-0.761
0.1400	-0.754
0.1433	-0.748
0.1466	-0.744
0.1500	-0.744
0.1533	-0.748
0.1566	-0.751
0.1600	-0.758
0.1633	-0.764
0.1666	-0.771
0.1700	-0.778
0.1733	-0.785
0.1766	-0.788
0.1800	-0.792
0.1833	-0.795
0.1866	-0.795
0.1900	-0.798
0.1933	-0.798
0.1966	-0.795
0.2000	-0.795
0.2033	-0.792
0.2066	-0.792
0.2100	-0.788
.2133	-0.788
.2166	-0.788
0.2200	-0.785
0.2233	-0.785
0.2266	-0.785
0.2300	-0.785
0.2333	-0.788
0.2366	-0.788
0.2400	-0.788
0.2433	-0.792
0.2466	-0.792
0.2500	-0.792
0.2533	-0.792
0.2566	-0.795
0.2600	-0.795
0.2633	-0.795
0.2666	-0.795
0.2700	-0.795
0.2733	-0.795
0.2766	-0.795
0.2800	-0.795
0.2833	-0.795
0.2866	-0.795
0.2900	-0.795
0.2933	-0.795
0.2966	-0.795
.3000	-0.795

0.3033	-0.795
0.3066	-0.795
0.3100	-0.795
3133	-0.795
3166	-0.795
3200	-0.795
0.3233	-0.795
0.3266	-0.795
0.3300	-0.795
0.3333	-0.795
0.3500	-0.795
0.3666	-0.798
0.3833	-0.798
0.4000	-0.798
0.4166	-0.798
0.4333	-0.798
0.4500	-0.798
0.4666	-0.798
0.4833	-0.798
0.5000	-0.798
0.5166	-0.798
0.5333	-0.798
0.5500	-0.798
0.5666	-0.798
0.5833	-0.798
0.6000	-0.802
0.6166	-0.798
0.6333	-0.798
6500	-0.798
6666	-0.798
6833	-0.798
0.7000	-0.798
0.7166	-0.798
0.7333	-0.798
0.7500	-0.798
0.7666	-0.798
0.7833	-0.798
0.8000	-0.798
0.8166	-0.798
0.8333	-0.798
0.8500	-0.798
0.8666	-0.798
0.8833	-0.798
0.9000	-0.798
0.9166	-0.798
0.9333	-0.798
0.9500	-0.798
0.9666	-0.798
0.9833	-0.798
1.0000	-0.798
1.2000	-0.798
1.4000	-0.798
1.6000	-0.802
8000	-0.802
0000	-0.802

2.2000	-0.802
2.4000	-0.805
2.6000	-0.802
.8000	-0.805
.0000	-0.805
3.2000	-0.805
3.4000	-0.805
3.6000	-0.819
3.8000	-0.819
4.0000	-0.819
4.2000	-0.819
4.4000	-0.859
4.6000	-0.859
4.8000	-0.859
5.0000	-0.859
5.2000	-0.859
5.4000	-0.863
5.6000	-0.863
5.8000	-0.863
6.0000	-0.863
6.2000	-0.863
6.4000	-0.863
6.6000	-0.866
6.8000	-0.866
7.0000	-0.866
7.2000	-0.866
7.4000	-0.870
7.6000	-0.870
7.8000	-0.870
.0000	-0.870
8.2000	-0.870
8.4000	-0.873
8.6000	-0.873
8.8000	-0.873
9.0000	-0.873
9.2000	-0.873
9.4000	-0.873
9.6000	-0.873
9.8000	-0.873
10.0000	-0.873
12.0000	-0.873
14.0000	-0.870
16.0000	-0.870

END

APPENDIX D

GROUNDWATER AND SURFACE WATER SAMPLING METHODS AND MEASUREMENT DATA

D.1 INTRODUCTION

D.1.0.1. This appendix presents groundwater and surface water sampling methods and data generated during investigations of the groundwater and surface water at TEAD-N during the Phase II RFI field activities. All data on the Groundwater/Surface Water Sampling Logs included in this appendix were recorded in the field by Montgomery Watson personnel at the time of the field activity. The data included here are measurements of the physical characteristics of the groundwater and surface water samples, and do not include the analyzed chemical parameters. The analytical data are included in the SWMU-specific sections of this report, and also in Appendix P.

D.1.0.2. The scope of the Phase II RFI groundwater and surface water investigations consisted of the following:

- Two rounds of groundwater sampling and water level measurements at the two new monitoring wells and one existing well at the Stormwater Discharge Area (SWMU 45)

- Surface water sampling at the Deactivation Furnace Building (SWMU 21). One surface water sample was collected from a watering trough, which is used occasionally by wildlife, supplied by the TEAD water system.

D.2 SAMPLING METHODOLOGY

D.2.0.1. Groundwater Sampling. Following development, each of the new wells and existing Well T-7 were sampled during two rounds of groundwater sampling. The first sampling round was conducted on November 22 and 23, 1993 and the second round took place on February 1 and 2, 1994. Prior to sampling, each well was purged using a decontaminated stainless steel submersible pump until at least five times the saturated borehole volume had been removed and the turbidity was less than five NTUs. Groundwater measurements taken on the three wells during sampling were recorded on

the Groundwater Sampling Forms included in this appendix. The results of these measurements can be summarized as follows:

1. The pH values of the groundwater at SWMU 45 are generally neutral to very slightly acidic. The measured values ranged from 6.2 to 6.3 during the November 1993 sampling round and from 7.1 to 7.2 during the February 1994 sampling round. The difference in readings between each round is likely due to the effect sub-freezing temperatures had on the instrumentation during the February sampling round.

2. The specific conductivity, a measure of the type and concentration of dissolved constituents present, ranged from 1,700 to 2,000 µmhos in November 1993 and from 1,800 to 2,400 µmhos in February 1994. For comparison, potable subsurface water usually ranges from 30 to 2,000 µmhos, and sea water commonly measures 45,000 to 55,000 µmhos.

3. The measured temperature at the time of sampling was 13.9°C in all three wells during the November 1993 sampling round and ranged from 13.6°C to 14.1°C during the second sampling round.

4. For both sampling rounds, the turbidity was less than 5 NTUs in each of the wells at the time of sampling. These turbidity values were generally reached within a purge amount of five casing volumes.

D.2.0.2. Except for VOCs, the analyte-specific sampling containers were filled directly from a spigot attached to the stainless steel pipe running from the submersible pump to the surface. The samples for VOC analysis were obtained using a dedicated bailer. All containers except those for VOCs were rinsed with the sampled groundwater prior to filling. No filtering was done on the aliquot for metals analysis.

D.2.0.3. Surface Water. The one surface water sample collected during the Phase II RFI was from a watering trough at SWMU 21. The spigot feeding this trough runs continuously. The pH of this sample was 7.45, specific conductivity was 1110 µmhos, temperature was 17.6°C, and the turbidity was zero. This information is documented on the Surface Water Sampling Log included in this appendix.

D.2.0.4. With the exception of the VOC samples, sample containers were filled directly from the watering trough following rinsing with the sampled water. The VOC sample containers were not rinsed prior to filling.

DEACTIVATION FURNACE BUILDING
(SWMU 21)

SURFACE WATER SAMPLING LOG

GROUNDWATER/SURFACE WATER SAMPLING LOG
Montgomery Watson

SWMU Number 21

Sample Location SWMU-21 (Surface Water) Groundwater S.W. Log Number _____
(Use: Well name/Log number)

Sampling Personnel [illegible] Date 10-7-93 Weather Cloudy & rainy - 55°

MEASUREMENT SUMMARY:

Calculated Purge Volume 0 gallons Total Depth S.W. Borehole Diameter 0

Depth to water 0 Time 1105 Measuring point 0

Final pH 7.45 Final SC 1110 Final Temp(°C) 17.6 Final NTU 0

SAMPLING SUMMARY: Grab sample

Casing evacuated with: Dedicated Pump 0 Portable Submersible Pump 0 Bailer 0

Pump Started 0 Pump Stopped 0 Total gallons 0 Individual Sample Container 0

Time	pH	SC	Temp	Turbidity (NTUs)	Flow rate (gpm)	Comments
1119	7.45	1110	17.6°	0	.5 gpm	no sheen / 0.0ppm OVM
water clear and flowing / NO LNAPL						

INSTRUMENTATION: pH Meter: Orion ☐ Cole-Parmer ☐ Calibration Buffers: 4 ☐ 7 ☐ 10 ☐

Horiba ✓ Specific Conductivity Meter: Markson ☐ YSI ☐ Standard Solution _____umhos/cm

Horiba standard Turbidity Meter: Calibration Standard _____ NTUs

SAMPLES COLLECTED AND TIME: ~~Filtered~~/Total Metals X Pesticides 0 Herbicides 0 Cyanide 0

VOCS 0 Dioxins/Furans X Nitrate/Nitrate and Phosphate 0

SVOCS 0 BTEX 0 Anions 0 Explosives X

P [illegible] 2942.0170

STORMWATER DISCHARGE AREA
(SWMU 45)

GROUNDWATER SAMPLING LOGS

Round 1 - November 1993

GROUNDWATER/SURFACE WATER SAMPLING LOG
Montgomery Watson

SWMU Number 45

Sample Location TEAD-N N-142-93 Surface Water/Groundwater _____ Log Number N-142-93 (Use: Well name/Log number)

Sampling Personnel BRIAN HAMES Date 11-22-93 Weather 40°, OVERCAST

MEASUREMENT SUMMARY:

Calculated Purge Volume 213 gallons Total Depth 374.27 Borehole Diameter 10"

Depth to water 349.13 Time 0920 Measuring point TOP OF CASING

Final pH 6.18 Final SC 2000 Final Temp(°C) 13.9 Final NTU 0.64

SAMPLING SUMMARY:

Casing evacuated with: Dedicated Pump _____ Portable Submersible Pump ✓ Bailer _____

Pump Started 1300 Pump Stopped 1330 Total gallons 258 Individual Sample Container _____

Time	pH	SC	Temp	Turbidity (NTUs)	Flow rate (gpm)	Comments
1304	8.41	2100	13.8°C	4.20	10	40 GAL.
1308	7.53	2000	13.9	3.02	"	80 GAL.
1312	6.82	2000	14.1	1.41	"	120 GAL
1316	6.57	2000	13.9	1.02	"	160 GAL
1320	6.32	2000	13.7	0.65	7	188 GAL
1325	6.24	2000	13.9	0.70	7	223 GAL
1330	6.18	2000	13.9	0.64	7	258 GAL

INSTRUMENTATION: pH Meter: Orion ☒ Cole-Parmer ☐ Calibration Buffers: 4 ☒ 7 ☒ 10 ☐

Specific Conductivity Meter: ~~Markson~~ AMPERE SCIENCE ☑ YSI ☐ Standard Solution 2000 umhos/cm

Turbidity Meter: HF SCIENTIFIC DRT 15C Calibration Standard 0.02 NTUs

SAMPLES COLLECTED AND TIME: ~~Filtered~~/Total Metals 1330 Pesticides 1330 Herbicides ____ Cyanide ____

VOCS 1420 Dioxins/Furans ____ Nitrate/Nitrate and Phosphate ____

SVOCS 1330 BTEX ____ Anions ____ Explosives 1330

ICI NO 2942.0170

GROUNDWATER/SURFACE WATER SAMPLING LOG
Montgomery Watson

SWMU Number 45

Sample Location TEAD-N N-143-93 Surface Water/Groundwater ~~Groundwater~~ Log Number N-143-93
(Use: Well name/Log number)

Sampling Personnel BRIAN HAINES Date 11-23-93 Weather 3° OVERCAST

MEASUREMENT SUMMARY:
Calculated Purge Volume 256 gallons Total Depth 349.40 Borehole Diameter 10"
Depth to water 319.10 Time 1015 Measuring point TOP OF CASING
Final pH 6.27 Final SC 1800 Final Temp(°C) 13.9 Final NTU 1.1

SAMPLING SUMMARY:
Casing evacuated with: Dedicated Pump _____ Portable Submersible Pump ✓ Bailer _____
Pump Started 0830 Pump Stopped 0900 Total gallons 300 Individual Sample Container _____

Time	pH	SC	Temp	Turbidity (NTUs)	Flow rate (gpm)	Comments
0835	8.2	1850	13.4	4.6	10	50 GAL.
0840	7.60	1850	13.7	3.2	"	100 GAL.
0845	6.8	1800	13.6	2.2	"	150 GAL.
0850	6.61	1800	13.9	1.8	"	200 GAL.
0855	6.35	1800	13.8	1.3	"	250 GAL.
0900	6.27	1800	13.9	1.1	"	300 GAL.

INSTRUMENTATION: pH Meter: Orion ☒ Cole-Parmer ☐ Calibration Buffers: 4 ☒ 7 ☒ 10 ☐
Specific Conductivity Meter: ~~Markson~~ TIMBER SILVACE ☑ YSI ☐ Standard Solution 2000 umhos/cm
Turbidity Meter: HF SCIENTIFIC DRT 15C Calibration Standard 0.02 NTUs

SAMPLES COLLECTED AND TIME: ~~Filtered~~/Total Metals 0900 Pesticides 0900 Herbicides ____ Cyanide ____
VOCS 1020 Dioxins/Furans ____ Nitrate/Nitrate and Phosphate ____
SVOCS 0900 BTEX ____ Anions ____ Explosives 0900

II.CT NO 2942.0170

GROUNDWATER/SURFACE WATER SAMPLING LOG
Montgomery Watson

SWMU Number 45

Sample Location TEAD-N T-7 Surface Water/Groundwater Log Number T-7 (Use: Well name/Log number)

Sampling Personnel BRIAN HAMOS Date 11-23-93 Weather 30°; P.C.

MEASUREMENT SUMMARY:

Calculated Purge Volume 142 gallons Total Depth 333.82 Borehole Diameter 10"

Depth to water 317.02 Time 1030 Measuring point TOP OF CASING

Final pH 6.16 Final SC 1700 Final Temp(°C) 13.9 Final NTU 2.3

SAMPLING SUMMARY:

Casing evacuated with: Dedicated Pump _____ Portable Submersible Pump ✓ Bailer _____

Pump Started 1310 Pump Stopped 1330 Total gallons 200 Individual Sample Container _____

Time	pH	SC	Temp	Turbidity (NTUs)	Flow rate (gpm)	Comments
1313	7.42	1600	13.8	49	10	30 Gal
1316	7.68	1700	13.9	19	"	60 "
1319	6.80	1700	14.1	11	"	90 "
1322	6.50	1700	14.1	6	"	120 "
1325	6.30	1700	13.9	4.2	"	150 "
1328	6.13	1700	13.9	2.6	"	180 "
1330	6.16	1700	13.9	2.3	"	200 "

INSTRUMENTATION: pH Meter: Orion ☒ Cole-Parmer ☐ Calibration Buffers: 4 ☒ 7 ☒ 10 ☐

Specific Conductivity Meter: ~~Markson~~ AMBER SCIENCE ☒ YSI ☐ Standard Solution 2000 umhos/cm

Turbidity Meter: HF SCIENTIFIC DRT 15C Calibration Standard 0.02 NTUs

SAMPLES COLLECTED AND TIME: ~~Filtered~~/Total Metals 1330 Pesticides 1330 Herbicides ____ Cyanide ____

VOCS 1430 Dioxins/Furans ____ Nitrate/Nitrate and Phosphate ____

SVOCS 1330 BTEX ____ Anions ____ Explosives 1330

CT NO 2942.0170

STORMWATER DISCHARGE AREA
(SWMU 45)

GROUNDWATER SAMPLING LOGS

Round 2 - February 1994

GROUNDWATER/SURFACE WATER SAMPLING LOG
Montgomery Watson

SWMU Number 45

Sample Location N-142S3 Surface Water/(Groundwater) Log Number N-142-93
(Use: Well name/Log number)

Sampling Personnel BRIAN HAMOS Date 2-1-94 Weather 25°, CLEAR

MEASUREMENT SUMMARY:

Calculated Purge Volume 220 gallons Total Depth 374.27 Borehole Diameter 10"

Depth to water 346.32 Time 0905 Measuring point T.O.C.

Final pH 7.07 Final SC 2,420 umhos/cm Final Temp(°C) 13.7° Final NTU 4

SAMPLING SUMMARY:

Casing evacuated with: Dedicated Pump _____ Portable Submersible Pump 3" GRUNDFOS Bailer _____

Pump Started 1200 Pump Stopped 1232 Total gallons 240 (325 w/sampling) Individual Sample Container _____

Time	pH	SC (umhos/cm)	Temp (°C)	Turbidity (NTUs)	Flow rate (gpm)	Comments
1203	6.89	2,440	11.6°	110	10 gpm	Initial purge H_2O
1208	6.92	2,350	12.7°	36	"	Slightly cloudy ~ 50-60 gals
1213	6.77	2,340	12.7°	37	"	@ 100 gals - clear to eye.
1217	6.84	2,320	12.7°	32	"	@ 140 gals - " .
1223	7.05	2,420	13.2°	2	"	@ 200 gals - " .
1226	7.07	2,420	13.7°	4	"	@ 230 gals - " .

INSTRUMENTATION: pH Meter: Orion ☐ Cole-Parmer ☐ HORIBA Calibration Buffers: 4 ☐ 7 ☐ 10 ☐

HORIBA U-10 WATER QUALITY CHECKER FOR ALL Specific Conductivity Meter: Markson ☐ YSI ☐ Standard Solution _____ umhos/cm

Turbidity Meter: Calibration Standard _____ NTUs

SAMPLES COLLECTED AND TIME: Filtered/Total Metals ✓ Pesticides ✓ Herbicides ___ Cyanide ___

VOCS ✓ Dioxins/Furans ___ Nitrate/Nitrate and Phosphate ___

SVOCS ✓ BTEX ___ Anions ✓ Explosives ✓

1435 FOR VOCs, 1226 FOR ALL OTHERS

LOCT NO 2942.0170

GROUNDWATER/SURFACE WATER SAMPLING LOG
Montgomery Watson

SWMU Number 45

Sample Location N-143-93 Surface Water/Groundwater (circled) Log Number N-143-93
(Use: Well name/Log number)

Sampling Personnel BRIAN HAMOS Date 2-2-94 Weather 15°, SUNNY

MEASUREMENT SUMMARY:
Calculated Purge Volume 262 gallons Total Depth 349.42 Borehole Diameter 10"
Depth to water 318.41 Time 0845 Measuring point T.O.C.
Final pH 7.23 Final SC 1,910 Final Temp(°C) 13.6 Final NTU 1

SAMPLING SUMMARY:
Casing evacuated with: Dedicated Pump ____ Portable Submersible Pump 3" GRUNDFOS Bailer ____
Pump Started 0902 Pump Stopped 0940 Total gallons 380 Individual Sample Container ____

Time	pH	SC (umhos)	Temp	Turbidity (NTUs)	Flow rate (gpm)	Comments
0903	7.05	1,700	12.7	147	10	10 GAL. PURGED
0909	7.21	1850	13.0	25	10	70 GAL. "
0914	7.25	1,880	13.2	150	10	120 GAL. "
0919	7.20	1,890	13.6	4	10	170 GAL. "
0924	7.22	1,900	13.5	2	10	220 GAL "
0929	7.21	1,890	13.6	2	10	270 GAL "
0932	7.23	1,910	13.6	1	10	300 GAL. "

INSTRUMENTATION: pH Meter: Orion ☐ Cole-Parmer ☐ Calibration Buffers: 4 ☐ 7 ☐ 10 ☐
HORIBA U-10 WATER QUALITY CHECKER Specific Conductivity Meter: Markson ☐ YSI ☐ Standard Solution ____ umhos/cm
Turbidity Meter: Calibration Standard ____ NTUs

SAMPLES COLLECTED AND TIME: Filtered/Total Metals ✓ Pesticides ✓ Herbicides ____ Cyanide ____
VOCS ✓ Dioxins/Furans ____ Nitrate/Nitrate and Phosphate ____
SVOCS ✓ BTEX ____ Anions ✓ Explosives ✓

VOC's @ 1040 all others at 0932

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GROUNDWATER/SURFACE WATER SAMPLING LOG
Montgomery Watson

SWMU Number 45

Sample Location T-7 Surface Water/Groundwater Log Number T-7 (Use: Well name/Log number)

Sampling Personnel BRIAN HAMOS Date 2-2-94 Weather 15°, SUNNY

MEASUREMENT SUMMARY:

Calculated Purge Volume 148 gallons Total Depth 333.81 Borehole Diameter 10"

Depth to water 316.35 Time 0830 Measuring point T.O.C.

Final pH 7.24 Final SC 1,810 Final Temp(°C) 14.1 Final NTU 4

SAMPLING SUMMARY:

Casing evacuated with: Dedicated Pump _____ Portable Submersible Pump 3" GRUNDFOS Bailer _____

Pump Started 1257 Pump Stopped 1334 Total gallons 370 Individual Sample Container _____

Time	pH	SC (umhos)	Temp	Turbidity (NTUs)	Flow rate (gpm)	Comments
1300	7.20	1,800	14.0	640	10	30 6.4L. PURGED
1303	7.27	1,800	14.1	435	"	60 " "
1306	7.27	1,800	14.1	350	"	90 " "
1309	7.29	1,780	13.1	65	"	120 " "
1312	7.26	1,810	13.7	37	"	150 " "
1315	7.28	1,810	13.9	29	"	180 " "
1318	7.28	1,810	14.0	4	"	210 " " (wiped turbidity probe clean)
1321	7.25	1,810	14.1	5	"	240 " "
1324	7.27	1,810	14.1	3	"	270 " "
1327	7.24	1,810	14.1	4	"	300 " "

INSTRUMENTATION: pH Meter: Orion ☐ Cole-Parmer ☐ Calibration Buffers: 4 ☐ 7 ☐ 10 ☐

HORIBA U-10 WATER QUALITY CHECKER FOR ALL

Specific Conductivity Meter: Markson ☐ YSI ☐ Standard Solution _____ umhos/cm

Turbidity Meter: Calibration Standard _____ NTUs

SAMPLES COLLECTED AND TIME: Filtered/Total Metals ✓ Pesticides ✓ Herbicides ___ Cyanide ___

VOCS ✓ Dioxins/Furans ___ Nitrate/Nitrate and Phosphate ___

SVOCS ✓ BTEX ___ Anions ✓ Explosives ✓

VOCs @ 1425, ALL OTHERS AT 1330

CT NO 2942.0170

DEACTIVATION FURNACE BUILDING
(SWMU 21)

SURFACE WATER SAMPLING LOG

GROUNDWATER/SURFACE WATER SAMPLING LOG
Montgomery Watson

SWMU Number 21

Sample Location SWMU-21 (Surface Water/Groundwater) S.W. Log Number _____ (Use: Well name/Log number)

Sampling Personnel [illegible] Date 10-7-93 Weather Cloudy & rainy -55°

MEASUREMENT SUMMARY:

Calculated Purge Volume 0 gallons Total Depth S.W. Borehole Diameter 0

Depth to water 0 Time 1105 Measuring point 0

Final pH 7.45 Final SC 1110 Final Temp(°C) 17.6 Final NTU 0

SAMPLING SUMMARY: Grab sample

Casing evacuated with: Dedicated Pump 0 Portable Submersible Pump 0 Bailer 0

Pump Started 0 Pump Stopped 0 Total gallons 0 Individual Sample Container 0

Time	pH	SC	Temp	Turbidity (NTUs)	Flow rate (gpm)	Comments
1119	7.45	1110	17.6°	0	.5 gpm	no sheen / 0.0ppm OVM
water clear and flowing / NO LNAPL						

INSTRUMENTATION: pH Meter: Orion ☐ Cole-Parmer ☐ Calibration Buffers: 4 ☐ 7 ☐ 10 ☐

Horiba & Specific Conductivity Meter: Markson ☐ YSI ☐ Standard Solution _____ umhos/cm

Horiba standard Turbidity Meter: Calibration Standard _____ NTUs

SAMPLES COLLECTED AND TIME: ~~Filtered~~/Total Metals X Pesticides 0 ~~Herbicides~~ 0 ~~Cyanide~~ 0

VOCS 0 Dioxins/Furans X Nitrate/Nitrate and Phosphate 0

SVOCS 0 BTEX 0 Anions 0 Explosives X

JI NO. 2942.0170

APPENDIX E

ANALYTICAL PROGRAM SUMMARY AND DATA QUALITY ASSESSMENT

E.0.0.1. This section describes the selection of analytes, analytical methods, and quality assurance/quality control (QA/QC) procedures and QC results developed to ensure collection of reliable data during the Tooele Army Depot North Area (TEAD-N) Phase II RFI, Group A Suspected Releases SWMUs. The following documents were utilized during evaluation of the QC data: TEAD - N Phase II RFI, Group A Suspected Releases SWMUs, DCQAP (MW, 1993a); USATHAMA Quality Assurance Program, (USATHAMA, 1990); User's Guide, IRDMIS, Volume II Data Dictionary, Potomac Research Institute (PRI), 1991; the USEPA's Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, (USEPA, 1988a); and the USEPA's National Functional Guidelines for Organic Data Review, (USEPA, 1991). Samples were collected during three separate periods of time. The bulk of the samples were collected between August 4, 1993 and November 23, 1993. The second period of sampling, called the "addendum", occurred between May 18, 1994 and June 9, 1994. The addendum sampling which only involved soil samples, was done to fill data gaps that were identified during preliminary reviews of the data from the previous sampling efforts. The third period of sampling, called the addendum II, occurred on August 8 and 9, 1995. The addendum II sampling, which only involved surface soil sampling at SWMUs 20 and 42, was done to fill data gaps identified during regulatory reviews of this document.

E.1 SELECTION OF ANALYTES

E.1.0.1. This portion of Appendix E is devoted to an evaluation and screening of the chemicals listed in 40 CFR, Part 261, Appendix VIII and Part 264, Appendix IX for the purpose of selecting the appropriate analytes for the RFI soil and groundwater analytical programs. This evaluation was done in context of an RFI at a military base and the assignment of codes is regarded as screening level effort. Other sites will certainly differ with regard to activities and chemicals used, and any application of the information in this evaluation is the responsibility of the user.

E.1.0.2. Chemicals of potential concern that were analyzed as part of the RFI were selected based on the probability that they were used at SWMUs at Tooele or that they

may have been formed as a result of activities at Tooele. Organic chemicals used or handled at Tooele include hydrocarbon fuels, lubricants or solvents, chlorinated solvents, explosives chemicals, and selected pesticides (including herbicides). Other organic chemicals also present at Tooele could include combustion or pyrolysis products derived from explosives destruction, furnaces, or materials burning operations.

E.1.0.3. As required by the TEAD-N Corrective Action Permit, chemicals of potential concern were selected from listed Appendix VIII and IX constituents. Some chemicals were not selected for analyses for a variety of reasons. Criteria for not including chemicals in the analysis program was that Tooele would not have handled or generated many of the chemicals that are associated with the manufacturing and intermediate use chemical industries. Other chemicals can be considered non-persistent in the soil/water environment and therefore, need not be analyzed for unless standardized, EPA-approved, methods are available. Also, many of the chemicals on the lists are not included in the specific analyte list that accompanies approved EPA methods, but these chemicals are amenable to analysis by the method, and would appear as tentatively identified compound (TICs).

E.1.0.4. In the interest of performing a reasonable analytical program, an organic chemist with extensive experience evaluating the occurrence and persistence of chemicals in the environment reviewed the Appendices lists, and provided rationale for including or deleting chemicals from the present analytical program. The results of these reviews are presented as Attachments E-1 and E-2 at the end of this Appendix. As a first level of evaluation, chemicals that are analyzed by approved EPA or Army methods were identified. Additionally, chemicals that likely would appear as TICs were identified. For the purpose of determining which chemicals could be deleted from the analysis program, those chemicals that are expected to have low persistence in the environment (nominal half-lives of several years) were flagged. Chemicals whose analyses could be deferred until current planned analyses demonstrate the need for the specific analyses were also noted. For example, the presence of the herbicide 2,4,5-T in a pesticide handling area may require analyses for TCDD.

E.1.0.5. The remaining chemicals on the lists were then evaluated in the context of the probability of their being present at Tooele. Most of these chemicals can be regarded as specialty chemicals. Where possible, some indication of the use of the chemical was provided. In general, the chemicals in this latter evaluation are regarded as being

unlikely at Tooele. It also should be noted that a number of pesticides (including rodent poisons, herbicides, and fungicides) are on the lists; these chemicals should not be analyzed in a general program at Tooele unless specific pesticide handling and use areas are identified.

E.1.0.6. The codes used for these valuations are as follows:

A	Analyzed in this program
A-A	Chemical likely to be picked up in analysis as it is a structural analog of another chemical that is being analyzed
AT	Analyzed, based on total element present
HYD	Unstable due to hydrolysis in environment
D	Defer analysis until other chemicals related to potential activity are found at site
OX	Unstable due to oxidation in environment
SC	Specialty chemical, unlikely used at Tooele
SC-S	Specialty chemical, used as solvent in processing
TP/SC	Transformation product of specialty chemical
P	Pesticides, may be analyzed in future investigations if other pesticides or herbicides are present
SC-M	Specialty chemical of medical or natural product origin

E.2 ANALYTICAL METHODS

E.2.0.1. Soil, sediment, surface water, groundwater, and air samples were collected during TEAD - N Phase II RFI and analyzed for numerous organic and inorganic

parameters in accordance with the Phase II DCQAP. Classes of chemicals measured in the RFI included VOCs, SVOCs, organochlorine pesticides (OCPs), nitroaromatic compounds (explosives), dioxin/furans, metals, and several miscellaneous chemical parameters. Based on the evaluation and screening process described in the preceding section, the RFI analytical methods listed in Table E-1 were selected. Environmental Science and Engineering, Inc. (ESE) in Gainesville, Florida, performed all the analyses except the dioxin/furan analyses, which were performed by Enseco, Inc. (now known as Quanterra) in Sacramento, California, and the air analyses that were performed by DataChem in Salt Lake City, Utah.

E.2.0.2. Selected analytical program results from both phases of the RFI analytical programs are presented in "Hits-only" tables that are included in Appendix O. A complete listing of all analytical results for the Phase II RFI analytical programs may be found in Appendix P. For a complete listing of all analytical results from the Phase I RFI program, the reader is referred to the Phase I RFI report, (Montgomery Watson, 1993). As discussed in Section 4.0, some of the USAEC CRLs varied from the USEPA SW-846 PQLs. To resolve this discrepancy, the laboratory prepared a detailed report of the comparison of their CRLs to the PQLs. This report is included in Attachment E-3.

E.3 DATA QUALITY ASSESSMENT STRUCTURE

E.3.0.1. A comparison of the Phase II RFI, analytical results to project data quality objectives (DQOs) as defined in the DCQAP formed the basis for evaluating the quality of the analytical data. As described in the DCQAP, analytical data must be of a known and acceptable quality to be used to evaluate site contamination at TEAD-N. Determination of data quality is based on evaluation of the precision, accuracy, representativeness, comparability, and completeness (PARCC) characteristics of the data. Once these characteristics have been evaluated, a determination may be made whether the data are appropriate for the intended uses of contamination assessment and risk assessment. With the exception of a limited number of analytical results, the analytical results meet the project DQOs and are appropriate for use in the contamination assessment without qualification. The USAEC chemistry branch reviewed the control charts of all the certified analyses and added data qualifiers as necessary based on their findings. All added qualifiers are included in the data tables used in this report. The review performed by the chemistry branch is the primary determinator of data useability. For the reader's convenience, these qualifiers, and the samples effected, have been

TABLE E-1

REFERENCE METHODS FOR SOIL AND AQUEOUS SAMPLES
(Page 1 of 2)

Parameter	USAEC Method		USEPA Method Equivalent		Method Description
	Soil	Aqueous	Soil	Aqueous	
Priority Pollutant Volatile Organic Compounds	LM19	UM20	8240	8240	GC/MS
BTEX	LO02	NS	8020	NS	GC/PID
Priority Pollutant Semivolatile Organic Compounds	LM18	UM18	8270	8270	GC/MS
Organochlorine Pesticides	LH10	UH02	8080	8080	GC/ECD
Explosives	LW12	UW32	8330	8330	HPLC
Total Petroleum Hydrocarbons	NA	NA	mod 8015	mod 8015	GC/PID
Total Analyte List Metals					
Aluminum	JS11	SS10	6010	200.7	ICP
Antimony	JS11	SS10	6010	200.7	ICP
Arsenic	JD19	SD22	7060	206.2	GFAA
Barium	JS11	SS10	6010	200.7	ICP
Beryllium	JS11	SS10	6010	200.7	ICP
Cadmium	JS11	SS10	6010	200.7	ICP
Calcium	JS11	SS10	6010	200.7	ICP
Chromium, total	JS11	SS10	6010	200.7	ICP
Cobalt	JS11	SS10	6010	200.7	ICP
Copper	JS11	SS10	6010	200.7	ICP
Iron	JS11	SS10	6010	200.7	ICP
Lead	JS11	SD20	6010	239.2	ICP/GFAA
Magnesium	JS11	SS10	6010	200.7	ICP
Manganese	JS11	SS10	6010	200.7	ICP
Mercury	JB01	SB01	7471	245.1	Cold Vapor AA
Nickel	JS11	SS10	6010	200.7	ICP
Potassium	JS11	SS10	6010	200.7	ICP
Selenium	JD15	SD21	7740	270.2	GFAA
Silver	JS11	SD23	6010	200.7	ICP
Sodium	JS11	SS10	6010	200.7	ICP
Thallium	JS11	SD09	6010	279.2	ICP/GFAA
Vanadium	JS11	SS10	6010	200.7	ICP
Zinc	JS11	SS10	6010	200.7	ICP

TABLE E-1

REFERENCE METHODS FOR SOIL AND AQUEOUS SAMPLES

Parameter	USAEC Method		USEPA Method Equivalent		Method Description
	Soil	Aqueous	Soil	Aqueous	
Dioxins/Furans	NS	NA	NS	8290	GC/MS High Res
Sulfate and Chloride	NS	TT10	NS	300.0	Ion Chromatography
Alkalinity	NS	NA	NS	310.1	Titrimetric
Total Dissolved Solids	NS	NA	NS	106.1	Gravimetric

NS Indicates analysis not scheduled for this matrix.
NA Indicates not applicable.

BTEX - Benzene, Toluene, Ethylbenzene, and Xylene
ICP - inductively coupled plasma
GC/MS - gas chromatography/mass spectroscopy, Res is resolution
GC - gas chromatography
IC - ion chromatography
PID - photoionization detector
FID - flame ionization detector
ECD - electron capture detector
HPLC - high pressure liquid chromatography
GFAA - graphite furnace atomic absorption
AA - atomic absorption
(a) Arsenic and Selenium will be reported as uncertified analytes, based on ICP quantitation.

summarized in Table E-2. Also included in Table E-2 is a discussion of the impact the qualifiers had on the data. Montgomery Watson chemists provided a secondary review of the data based on PARCC criteria established in DCQAP. Exceptions and nonconformances to the criteria established in the DCQAP are discussed in the following sections and presented in Table E-3. These exceptions are limited in nature and do not result in substantial qualification of data. The QC results discussed in the following sections are included as attachments at the end of this appendix.

E.3.0.2. The following section defines the QC parameters used during data evaluation and the objectives of each parameter defined. The results of the data evaluation are presented in Section E.4 by analytical group, matrix, and then by each QC parameter. As stated above, the tables that contain all the QC data are included at the end of this appendix as attachments.

E.3.1. Precision

E.3.1.1. Precision, the reproducibility of measurements under a given set of conditions, was evaluated based on the analysis of three different types of QC samples: laboratory control samples (LCS), duplicate field samples, and matrix spike and matrix spike duplicate (MS/MSD) samples. These three types of QC samples are discussed below.

E.3.1.2. Laboratory Control Samples. Spiked LCS samples and LCS duplicate samples are required as part of the USAEC analytical program for all methods, and provide ongoing information about the performance of each analytical method in a standard matrix. The results of these samples for both sampling events are presented in Attachment E-4. The results of these samples were compiled on control charts, which were submitted to the USAEC chemistry branch for approval before sample results were loaded into the IRDMIS database. USAEC has reviewed all LCS results related to the TEAD - N Phase II RFI, Group A Suspected Releases SWMUs.

E.3.1.3. Duplicate Field Samples. Duplicate field samples were included as part of the QA/QC Program in order to obtain additional information on sampling and analytical precision. The analysis of field duplicates provides an indication of the overall precision because measures field and laboratory precision. Samples were not qualified based on the results of these duplicate samples since the USEPA has no guidelines for this QC parameter. However, the amount of heterogeneity of the matrices is shown by the

TABLE E-2

SUMMARY OF DATA EVALUATION PERFORMED BY AEC CHEMISTRY BRANCH

Sample Identification	Sample Depth (feet)	Compound	Concentration/ Flag Code (µg/g)	Data Qualifier	Bias	Comment
Lot IGZA						
SB-20-007C	3.0	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-008A	0.0	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-008B	1.5	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-008C	3.0	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-009A	0.0	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-009B	1.5	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-009C	3.0	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-010A	0.0	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-010B	1.5	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-010C	3.0	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-011A	0.0	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-011B	1.5	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-011C	3.0	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-012A	0.0	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-012B	1.5	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-012C	3.0	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-013A	0.0	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-013B	1.5	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-013C	3.0	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
SB-20-014A	0.0	1,3,5-Trinitrobenzene	< 0.488	JR	Low	Low-spike recovery low and all compounds ND; data are rejected
Lot IGTA						
SB-42-037A	0.0	2-Nitrotoluene	< 0.307 D	J	Low	Low-spike recovery low and all compounds were ND
SB-42-040A	0.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
SB-42-040B	5.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
SB-42-041A	0.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
SB-42-041B	5.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
SB-42-042A	0.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
SB-42-042B	5.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
SB-42-043A	0.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
SB-42-043B	5.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
SB-42-044A	0.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
SB-42-044B	5.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
SB-42-045A	0.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
SB-42-045B	5.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND

TABLE E-2

SUMMARY OF DATA EVALUATION PERFORMED BY AEC CHEMISTRY BRANCH

Sample Identification	Sample Depth (feet)	Compound	Concentration/ Flag Code (µg/g)	Data Qualifier	Bias	Comment
Lot IGTA (continued)						
SB-42-046A	0.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
SB-42-046B	5.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
SB-42-047A	0.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
SB-42-047B	5.0	2-Nitrotoluene	< 0.307	J	Low	Low-spike recovery low and all compounds were ND
Lot NGPA						
SB-45-004A	6.5	PCB 1260	< 0.0804	N	Low	High-spike recovery low and all compounds were ND
SB-45-004B	9.0	PCB 1260	< 0.0804	N	Low	High-spike recovery low and all compounds were ND
SB-45-010A	7.0	PCB 1260	< 0.0804	N	Low	High-spike recovery low and all compounds were ND
SB-45-011A	9.0	PCB 1260	< 0.0804	N	Low	High-spike recovery low and all compounds were ND
SB-45-011B	10.5	PCB 1260	< 0.0804	N	Low	High-spike recovery low and all compounds were ND
SB-48-001A	4.0	PCB 1260	< 0.0804 D	N	Low	High-spike recovery low and all compounds were ND
SB-48-001A	4.0	PCB 1260	< 0.0804	N	Low	High-spike recovery low and all compounds were ND
SB-48-002A	3.5	PCB 1260	< 0.0804	N	Low	High-spike recovery low and all compounds were ND
SB-48-002B	10.0	PCB 1260	< 0.0804	N	Low	High-spike recovery low and all compounds were ND
Lot IAIA						
SB-34-004C	3.0	Aldrin	< 0.007	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		Dieldrin	< 0.006	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		Endosulfan sulfate	< 0.008	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		Endrin	< 0.007	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		Endrin aldehyde	< 0.024	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		Endrin ketone	< 0.024 R	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		Heptachlor	< 0.006	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		Heptachlor epoxide	< 0.006	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		Isodrin	< 0.005	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		gamma-BHC (Lindane)	< 0.006	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		Methoxychlor	<0.071	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		Toxaphene	< 0.444	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		alpha-BHC	< 0.009	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		alpha-Chlordane	< 0.003 R	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		Endosulfan I	< 0.006	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		beta-BHC	< 0.003	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		Endosulfan	< 0.007	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		delta-BHC	< 0.006	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		gamma-Chlordane	<0.003 R	K	Low	Extracted 2 days past extraction holding time; no impact on the data

TABLE E-2

SUMMARY OF DATA EVALUATION PERFORMED BY AEC CHEMISTRY BRANCH
(Page 3 of 4)

Sample Identification	Sample Depth (feet)	Compound	Concentration/ Flag Code (µg/g)	Data Qualifier	Bias	Comment
Lot IAIA						
SB-34-004C		p,p'-DDD	< 0.008	K	Low	Extracted 2 days past extraction holding time; no impact on the data
(continued)		p,p'-DDE	< 0.008	K	Low	Extracted 2 days past extraction holding time; no impact on the data
		p,p'-DDT	< 0.007	K	Low	Extracted 2 days past extraction holding time; no impact on the data
SB-34-007A	0.0	Aldrin	< 0.007	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		Dieldrin	< 0.006	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		Endosulfan sulfate	< 0.008	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		Endrin	< 0.007	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		Endrin aldehyde	< 0.024	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		Endrin ketone	< 0.024 R	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		Heptachlor	< 0.006	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		Heptachlor epoxide	< 0.006	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		Isodrin	< 0.005	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		gamma-BHC (Lindane)	< 0.006	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		Methoxychlor	<0.071	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		Toxaphene	< 0.444	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		alpha-BHC	< 0.009	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		alpha-Chlordane	0.004 S	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		Endosulfan I	< 0.006	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		beta-BHC	< 0.003	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		Endosulfan II	< 0.007	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		delta-BHC	< 0.006	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		gamma-Chlordane	0.007 S	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		p,p'-DDD	< 0.008	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		p,p'-DDE	0.008	K	Low	Extracted 1 day past extraction holding time; no impact on the data
		p,p'-DDT	< 0.007	K	Low	Extracted 1 day past extraction holding time; no impact on the data
Lot NCBA						
SB-42-018A	0.0	1,3,5-Trinitrobenzene	< 0.488	K	Low	Extracted 22 days past extraction holding time
		1,3-Dinitrobenzene	< 0.496	K	Low	Extracted 22 days past extraction holding time
		2,4,6-Trinitrotoluene	< 0.456	K	Low	Extracted 22 days past extraction holding time
		2,4-Dinitrotoluene	< 0.424	K	Low	Extracted 22 days past extraction holding time
		2,6-Dinitrotoluene	< 0.524	K	Low	Extracted 22 days past extraction holding time
		2-Nitrotoluene (TIC)	< 0.307	K	Low	Extracted 22 days past extraction holding time
		Cyclonite (RDX)	< 0.587	K	Low	Extracted 22 days past extraction holding time
		HMX	< 0.666	K	Low	Extracted 22 days past extraction holding time

TABLE E-2

SUMMARY OF DATA EVALUATION PERFORMED BY AEC CHEMISTRY BRANCH

Sample Identification	Sample Depth (feet)	Compound	Concentration/ Flag Code (µg/g)	Data Qualifier	Bias	Comment
Lot NCBA						
SB-42-018A		Nitramine (Tetryl)	< 0.731	K	Low	Extracted 22 days past extraction holding time
(continued)		Nitrobenzene	< 2.410	K	Low	Extracted 22 days past extraction holding time
		Nitroglycerine	< 4.000	K	Low	Extracted 22 days past extraction holding time
		PETN (TIC)	< 4.000	K	Low	Extracted 22 days past extraction holding time
Lot PDFA						
N-142-93	377	Chloride	490000 µg/L	LR	Low	Analyzed 18 days past analysis holding time; data is rejected
		Sulfate	1000000 µg/L	LR	Low	Analyzed 18 days past analysis holding time; data is rejected
N-143-93	346	Chloride	550000 µg/L	LR	Low	Analyzed 18 days past analysis holding time; data is rejected
		Sulfate	260000 µg/L	LR	Low	Analyzed 18 days past analysis holding time; data is rejected
T-7	322	Chloride	270000 µg/L	LR	Low	Analyzed 18 days past analysis holding time; data is rejected
		Sulfate	210000 µg/L	LR	Low	Analyzed 18 days past analysis holding time; data is rejected
Lot THAB						
N-142-93	377	2,4-Dinitrotoluene	< 0.064 µg/L	J	Low	Low-spike recovery low and all compounds were ND
N-142-93	377	2,4-Dinitrotoluene	< 0.064 µg/L D	J	Low	Low-spike recovery low and all compounds were ND
N-143-93	346	2,4-Dinitrotoluene	< 0.064 µg/L	J	Low	Low-spike recovery low and all compounds were ND
T-7	322	2,4-Dinitrotoluene	< 0.064 µg/L	J	Low	Low-spike recovery low and all compounds were ND

TIC - Tentatively identified compound
HMX - Cyclotetramethylenetetranitoamine
PETN - Pentaerythritol tetranitrate (TIC)
ND - Not detected

Flag Codes:
D - Duplicate analysis.
R - Non-target compound analyzed for but not detected.
S - Non-target compound analyzed for and detected. Also used to flag TICs.

Data Qualifiers:
J - The low-spike recovery is low.
K - Missed holding times for the extraction and preparation.
L - Missed holding time for sample analysis.
N - The high-spike recovery is low.
R - Data is rejected and is not useable.

TABLE E-3
SUMMARY OF DATA EVALUATION ANOMALIES
(Page 1 of 8)

Sample Identification	Depth (feet)	Compound	Data Flag	Bias	Comment(a)
SWMU 20 - AED Deactivation Furnace Site					
SB-20-001A	0.0	Arsenic	J	high	Estimated due to MS/MSD recovery nonconformances
		Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
SB-20-001B	1.5	Arsenic	J	low	Estimated due to MS/MSD recovery nonconformances
		Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
SB-20-002A	0.0	Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
		Antimony	J	low	Estimated due to MS/MSD recovery nonconformances
		Barium	J	high	Estimated due to MS/MSD recovery nonconformances
SB-20-002B	1.5	Vanadium	J	--	Estimated due to MS/MSD RPD nonconformances
		Antimony	J	low	Estimated due to MS/MSD recovery nonconformances
		Barium	J	high	Estimated due to MS/MSD recovery nonconformances
SB-20-015B	1.5	Antimony	J	low	Estimated due to MS/MSD recovery nonconformances
SB-20-016A	0.0	Arsenic	J	low	Estimated due to MS/MSD recovery nonconformances
		Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
		Barium	J	--	Estimated due to MS/MSD RPD nonconformances
		Copper	J	--	Estimated due to MS/MSD RPD nonconformances
		Lead	J	--	Estimated due to MS/MSD RPD nonconformances
		Zinc	J	--	Estimated due to MS/MSD RPD nonconformances
		Barium	J	low	Estimated due to MS/MSD recovery nonconformances
		Nickel	J	low	Estimated due to MS/MSD recovery nonconformances
		Zinc	J	high	Estimated due to MS/MSD recovery nonconformances
SB-20-016B	1.5	Arsenic	J	low	Estimated due to MS/MSD recovery nonconformances
		Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
SB-20-018A	0.0	Arsenic	J	high	Estimated due to MS/MSD recovery nonconformances
		Selenium	J	low	Estimated due to MS/MSD recovery nonconformances

-- Not applicable
(a) For detailed information on the comment, please refer to Section E.4.

TABLE E-3
SUMMARY OF DATA EVALUATION ANOMALIES
(Page 2 of 8)

Sample Identification	Depth (feet)	Compound	Data Flag	Bias	Comment(a)
SWMU 21 - Deactivation Furnace Building					
SD-21-001	0.0	Mercury	J	low	Estimated due to MS/MSD recovery nonconformances
SW-21-001	--	Thallium	J	low	Estimated due to MS/MSD recovery nonconformances
SWMU 34 - Pesticide Handling and Storage Area					
SB-34-001E	20.0	Isodrin	J	low	Estimated due to MS/MSD recovery nonconformances
SB-34-003C	11.0	Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
SB-34-004C	3.0	All OCP compounds	J	low	Estimated due to holding time nonconformances
SB-34-006B	1.5	Isodrin	J	low	Estimated due to MS/MSD recovery nonconformances
SB-34-007A	0.0	All OCP compounds	J	low	Estimated due to surrogate recovery nonconformances
		All OCP compounds	J	low	Estimated due to holding time nonconformances
SB-34-007B	1.5	All OCP compounds	J	low	Estimated due to surrogate recovery nonconformances
SB-34-010A	0.0	Isodrin	J	low	Estimated due to MS/MSD recovery nonconformances
SWMU 37 - Contaminated Waste Processing Plant					
SB-37-001A	0.0	Di-n-butylphthalate	U	--	Nondetect due to method blank results
SB-37-001B	1.5	Di-n-butylphthalate	U	--	Nondetect due to method blank results
SB-37-001C	3.0	Di-n-butylphthalate	U	--	Nondetect due to method blank results
SB-37-002A	0.0	Di-n-butylphthalate	U	--	Nondetect due to method blank results

-- Not applicable
(a) For detailed information on the comment, please refer to Section E.4.

TABLE E-3
SUMMARY OF DATA EVALUATION ANOMALIES
(Page 3 of 8)

Sample Identification	Depth (feet)	Compound	Data Flag	Bias	Comment(a)
SB-37-002B	1.5	Di-n-butylphthalate	U	--	Nondetect due to method blank results
SB-37-002C	3.0	Di-n-butylphthalate	U	--	Nondetect due to method blank results
SB-37-003A	0.0	Di-n-butylphthalate	U	--	Nondetect due to method blank results
SB-37-003B	1.5	Di-n-butylphthalate	U	--	Nondetect due to method blank results
SB-37-007B	1.5	4-chloro-3-methylphenol	J	--	Estimated due to MS/MSD RPD nonconformances
		4-nitrophenol	J	--	Estimated due to MS/MSD RPD nonconformances
		N-nitroso-di-n-propylamin	J	--	Estimated due to MS/MSD RPD nonconformances
SS-37-014	0.0	Di-n-butylphthalate	U	--	Nondetect due to method blank results
SS-37-014 DUP	0.0	Di-n-butylphthalate	U	--	Nondetect due to method blank results
SS-37-015	0.0	Di-n-butylphthalate	U	--	Nondetect due to method blank results
SS-37-016	0.0	Di-n-butylphthalate	U	--	Nondetect due to method blank results
SS-37-017	0.0	Di-n-butylphthalate	U	--	Nondetect due to method blank results
SS-37-018	0.0	Di-n-butylphthalate	U	--	Nondetect due to method blank results
SS-37-019	0.0	Di-n-butylphthalate	U	--	Nondetect due to method blank results
SS-37-020	0.0	Di-n-butylphthalate	U	--	Nondetect due to method blank results

-- Not applicable
(a) For detailed information on the comment, please refer to Section E.4.

TABLE E-3
SUMMARY OF DATA EVALUATION ANOMALIES
(Page 4 of 8)

Sample Identification	Depth (feet)	Compound	Data Flag	Bias	Comment(a)
SWMU 42 - Bomb Washout Building					
EP-42-002B	6.0	Zinc	U	--	Nondetect due to method blank results
SB-42-003A DUP	0.0	Arsenic	J	low	Estimated due to MS/MSD recovery nonconformances
		Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
SB-42-015D	77.0	2,4,6-Trinitrotoluene	J	low	Estimated due to surrogate recovery nonconformances
SB-42-016C	42.0	Antimony	J	low	Estimated due to MS/MSD recovery nonconformances
		Barium	J	low	Estimated due to MS/MSD recovery nonconformances
		Vanadium	J	low	Estimated due to MS/MSD recovery nonconformances
SB-42-017E	92.0	Arsenic	J	low	Estimated due to MS/MSD recovery and RPD nonconformance
SB-42-017E	92.0	Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
SB-42-018A	0.0	All explosives compounds	R	--	Rejected due to holding time nonconformances
SB-42-018A DUP	0.0	Barium	J	high	Estimated due to MS/MSD recovery nonconformances
SB-42-021B DUP	4.0	Barium	J	high	Estimated due to MS/MSD recovery nonconformances
SB-42-022B	3.0	Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
SB-42-028A	0.0	Arsenic	J	high	Estimated due to MS/MSD recovery nonconformances
		Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
		Antimony	J	low	Estimated due to MS/MSD recovery nonconformances
SB-42-028B	3.0	Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
		Vanadium	J	low	Estimated due to MS/MSD recovery nonconformances

-- Not applicable
(a) For detailed information on the comment, please refer to Section E.4.

TABLE E-3
SUMMARY OF DATA EVALUATION ANOMALIES
(Page 5 of 8)

Sample Identification	Depth (feet)	Compound	Data Flag	Bias	Comment(a)
SB-42-034B	5.0	Barium	J	low	Estimated due to MS/MSD recovery and RPD nonconformance
		Chromium	J	--	Estimated due to MS/MSD RPD nonconformances
		Lead	J	--	Estimated due to MS/MSD RPD nonconformances
		Nickel	J	low	Estimated due to MS/MSD recovery and RPD nonconformance
SB-42-034B (con't)	5.0	Vanadium	J	low	Estimated due to MS/MSD recovery nonconformances
SB-42-037A DUP	0.0	Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
SB-42-040A	0.0	Arsenic	U	--	Nondetect due to method blank results
SB-42-042B	5.0	Chromium	J	high	Estimated due to MS/MSD recovery and RPD nonconformance
		Antimony	J	low	Estimated due to MS/MSD recovery nonconformances
SB-42-044A	0.0	Antimony	J	low	Estimated due to MS/MSD recovery and RPD nonconformance
		Barium	J	high	Estimated due to MS/MSD recovery nonconformances
SB-42-044B	3.0	Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
SB-42-050A	0.5	Arsenic	J	high	Estimated due to MS/MSD recovery and RPD nonconformance
		Antimony	J	low	Estimated due to MS/MSD recovery nonconformances
		Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
		Mercury	J	low	Estimated due to MS/MSD recovery nonconformances
		Barium	J	high	Estimated due to MS/MSD recovery and RPD nonconformance
		Chromium	J	--	Estimated due to MS/MSD RPD nonconformances
		Copper	J	low	Estimated due to MS/MSD recovery nonconformances
		Lead	J	high	Estimated due to MS/MSD recovery and RPD nonconformance
		Nickel	J	--	Estimated due to MS/MSD RPD nonconformances
		Silver	J	low	Estimated due to MS/MSD recovery nonconformances
		Vanadium	U	--	Nondetect due to method blank results
		Zinc	J	high	Estimated due to MS/MSD recovery and RPD nonconformance

-- Not applicable
(a) For detailed information on the comment, please refer to Section E.4.

TABLE E-3
SUMMARY OF DATA EVALUATION ANOMALIES
(Page 6 of 8)

Sample Identification	Depth (feet)	Compound	Data Flag	Bias	Comment(a)
SB-42-050B	0.5	Acetone	U	--	Nondetect due to method blank results
SB-42-051A	0.5	Vanadium	U	--	Nondetect due to method blank results
SS-42-017	0.0	Hexavalent Chromium	J	high	Large positive interference during analysis.
SS-42-018	0.0	Hexavalent Chromium	J	high	Large positive interference during analysis.
SWMU 45 - Stormwater Discharge Area					
N-142-93	--	Isodrin	J	low	Estimated due to MS/MSD recovery nonconformances
		Sulfate	R	--	Rejected due to holding time nonconformances
		Alkalinity	R	--	Rejected due to holding time nonconformances
N-143-93		Sulfate	R	--	Rejected due to holding time nonconformances
		Alkalinity	R	--	Rejected due to holding time nonconformances
N-143-93 DUP	--	Chloroform	U	--	Nondetect due to method blank results
Well T-7	--	Sulfate	R	--	Rejected due to holding time nonconformances
		Alkalinity	R	--	Rejected due to holding time nonconformances
SB-45-002B	12.0	Zinc	U	--	Nondetect due to method blank results
SB-45-005A	12.0	Zinc	U	--	Nondetect due to method blank results
SB-45-006A	10.0	Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
		Barium	J	--	Estimated due to MS/MSD RPD nonconformances
		Zinc	U	--	Nondetect due to method blank results

-- Not applicable
(a) For detailed information on the comment, please refer to Section E.4.

TABLE E-3
SUMMARY OF DATA EVALUATION ANOMALIES
(Page 7 of 8)

Sample Identification	Depth (feet)	Compound	Data Flag	Bias	Comment(a)
SB-45-006B	11.5	Zinc	U	--	Nondetect due to method blank results
SB-45-008A	7.0	Zinc	U	--	Nondetect due to method blank results
SB-45-008B	10.0	Zinc	U	--	Nondetect due to method blank results
SB-45-012A	8.5	Zinc	U	--	Nondetect due to method blank results
		Vanadium	U	--	Nondetect due to method blank results
SB-45-012B	10.5	Zinc	U	--	Nondetect due to method blank results
		Vanadium	U	--	Nondetect due to method blank results
SB-45-013A	7.0	Vanadium	U	--	Nondetect due to method blank results
SB-45-013B	9.0	Vanadium	U	--	Nondetect due to method blank results
SB-45-014A	9.0	Zinc	U	--	Nondetect due to method blank results
		Vanadium	U	--	Nondetect due to method blank results
SB-45-014B	10.5	Vanadium	U	--	Nondetect due to method blank results
SWMU 48 - Old Dispensary Discharge, Building 400					
SB-48-001B	9.5	Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
		Cobalt	J	low	Estimated due to MS/MSD recovery nonconformances
		Vanadium	U	--	Nondetect due to method blank results
		Zinc	U	--	Nondetect due to method blank results
SB-48-002A	2.0	Acetone	U	--	Nondetect due to method blank results

-- Not applicable
(a) For detailed information on the comment, please refer to Section E.4.

TABLE E-3
SUMMARY OF DATA EVALUATION ANOMALIES
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Sample Identification	Depth (feet)	Compound	Data Flag	Bias	Comment(a)
SB-48-002B	10.0	Arsenic	J	low	Estimated due to MS/MSD recovery nonconformances
		Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
		Barium	J	low	Estimated due to MS/MSD recovery and RPD nonconformance
		Chromium	J	- -	Estimated due to MS/MSD RPD nonconformances
Background					
SB-BK-001	0.0	Mercury	J	low	Estimated due to MS/MSD recovery nonconformances
SB-BK-012B	3.0	Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
		Arsenic	J	low	Estimated due to MS/MSD recovery and RPD nonconformance
SB-BK-013A	0.0	Selenium	J	low	Estimated due to MS/MSD recovery nonconformances
SS-BK-001 DUP	0.0	Barium	J	high	Estimated due to MS/MSD recovery nonconformances
Source Water					
WW-3	- -	Zinc	U	- -	Nondetect due to method blank results
WW-3 DUP	- -	Zinc	U	- -	Nondetect due to method blank results

-- Not applicable
(a) For detailed information on the comment, please refer to Section E.4.

number of times the duplicate results exceeded the project control limits. Attachments E-5a and E-5b detail the soil and water field duplicates collected and the relative percent differences (RPDs) that were calculated for both soil and water matrices (only samples with concentrations greater than the CRL have RPDs calculated for them). Also included is Attachment E-5c is a summary of the number of RPDs calculated and the frequency with which RPD limits were exceeded for soil samples. Attachment E-5d provides a summary of the duplicates collected during the addendum work and the RPDs that were calculated.

E.3.1.4. Matrix Spike/Matrix Spike Duplicate Samples. The third type of QC used to evaluate the precision of the data was the RPDs of the MS/MSD samples. These duplicate results have much less variability than the field duplicates; thus, they aid in detecting any systematic problems in an analysis. These analyses also helped determine how well the target analytes could be recovered from environmental matrices; identifying whether there was a matrix effect. Attachments E-6a and E-6b list the MS/MSD spike recoveries and RPDs for the soil and water samples, respectively.

E.3.2. Accuracy

E.3.2.1. Accuracy, or the bias in a measurement system, is measured by determining the nearness of a data set to the true value. Accuracy for this project was evaluated based on laboratory control samples, surrogate compounds, and field samples spiked with target compounds (MS/MSD). Each type of spiked sample provided different information about the accuracy of the measurement system.

E.3.2.2. Laboratory Control Samples. LCSs were used as the primary control of accuracy in the laboratory system. As discussed in Section E.3.1, laboratory control sample results met project and USAEC requirements.

E.3.2.3. Surrogate Compounds. Surrogate compounds spiked into field samples provided information of the efficiency of all steps of the gas chromatography (GC) and gas chromatography/mass spectrometer (GC/MS) methods in recovering organic compounds from the individual environmental sample matrices. In the USAEC analytical program, surrogate recoveries are not used to determine if an analytical method is in control; instead they are used to obtain information on possible sample matrix effects. Because surrogates, were spiked into every environmental sample, they were the

primary tool used to determine if the sample matrix was interfering with the analysis of organic compounds. Consequently, surrogates will be the primary tool for accuracy evaluation and data qualification. Attachments E-7a and E-7b detail the surrogates recoveries for soil and water samples. Surrogates were not incorporated into the dioxin/furan analysis; instead, internal standard were used and evaluated against accuracy control limits. The dioxin/furan internal standard results are included in Attachments E-7c and E-7d.

E.3.2.4. Matrix Spike/Matrix Spike Duplicate Samples. The final type of QC sample used to assess accuracy was field samples spiked with target analytes (MS/MSD samples). The laboratory randomly selected five percent of the field samples to be spiked as MS/MSD samples. These results were used to assess the effect of the matrix on sample recovery. Attachments E-6a and E-6b provide the recoveries for all the spiking compounds for each group of analyses.

E.3.3. Representativeness

E.3.3.1. This objective expresses how well data represent the characteristics of a population, parameter variations, or environmental conditions. Representativeness was evaluated using method blanks, trip blanks, equipment rinsate blanks, and source water samples.

E.3.3.2. Method Blanks. One method blank is run with every USAEC analytical lot to provide a measure of contamination derived from laboratory equipment and reagents. USAEC lots are analysis dependent, which means that the same samples are not always grouped together for each analysis. The size of the lot is dependent upon the laboratory performing the analyses, because the size is set by the number of samples that the laboratory can process through the rate-limiting step of each method in one 24-hour period. USAEC sets 75 as the maximum number of samples that may be included in a lot. Attachment E-8a and E-8b list the method blanks that had detectable concentrations of any analytes along with the samples that were affected (based on the Functional Guidelines, affected samples are those that require qualification). Samples were qualified as nondetect if they contained up to five times the concentration detected in the method blank (this level is increased to ten times for the common laboratory contaminants: methylene chloride, acetone, toluene, 2-butanone, or one of the phthalate esters.

E.3.3.3. Trip Blanks. Trip blank samples were used to assess representativeness by providing information on possible VOC contamination introduced during sample handling, storage, and shipment of field samples. The trip blank samples were prepared in the laboratory using organic-free water. They were shipped with sample containers to the field and stored with the field samples. One trip blank was shipped with every cooler of samples to be analyzed for VOCs. The trip blank samples were analyzed for VOCs only. Six trip blank samples were used for this project, and none had detectable concentrations of VOCs. During the addendum work, four trip blank samples were used as shown in Attachment E-9. Acetone was detected in each blank and methylene chloride in two of them.

E.3.3.4. Equipment Rinsate Blanks. Equipment rinsate blank samples provide a measure of the cumulative contamination derived from the field sampling equipment, sample transit, storage, and analysis. They also are used to determine the effectiveness of the field decontamination procedures. The equipment rinsate blank samples were collected after the sample collection apparatus was decontaminated. Equipment rinsate blank samples were analyzed for the same parameters as the associated environmental samples. Attachment E-10 lists the analytical findings. Samples were qualified based on the Functional Guidelines' five and ten times rule described above for method blanks.

E.3.3.5. Source Water Samples. The source water samples provided information on the water used to decontaminate the sample collection devices. Duplicate source water samples were taken from TEAD Depot Supply Well No. 3 (WW-3) and analyzed for all parameters scheduled for the environmental field samples. These analyses were performed prior to the beginning of field work and all detectable concentrations of analytes are listed in Attachment E-11. These results were used in conjunction with the results of the equipment rinsate blanks to isolate the source of the contamination to determine the effectiveness of the decontamination procedures discussed in the equipment rinsate blank section above.

E.3.4. Completeness

E.3.4.0.1. Completeness compares the amount of valid data obtained to the amount that was expected to be obtained under optimal conditions. Two completeness objectives were established for this project: 100 percent for all background samples and 90 percent for all other types of samples.

E.3.4.0.2. The completeness evaluation also included method-required holding times. Compliance with this parameter is discussed in Section E.3 for each analytical method.

E.3.5. Comparability

E.3.5.0.1. The characteristic of comparability reflects the consistency of sample collection and handling procedures, analytical techniques, and expression of results in units consistent with other organizations reporting similar data. No changes to planned procedures were implemented that would affect data comparability. The use of USAEC protocols assists in assuring all data are comparable.

E.4 DATA QUALITY ASSESSMENT

E.4.0.1. This section details the results of the data quality assessment using the PARCC criteria parameter discussed in Section E.3. Each of the above QC parameters are discussed below, where applicable, for each analytical method.

E.4.1. Volatile Organic Compounds.

E.4.1.1. Laboratory Control Samples. The LCS results are included in Attachment E-4. USAEC has reviewed and approved all LCS results related to the TEAD-N Phase II RFI.

E.4.1.2. Field Duplicates. One soil field duplicate pair and one water field duplicate pair were collected and analyzed for VOCs. None of the duplicate pair samples had detectable concentrations of VOC compounds; therefore, the RPD could not be calculated. During the addendum effort six duplicates were collected. However there were no detectable concentrations; therefore, RPDs could not be calculated.

E.4.1.3. One soil field duplicate pair was collected and analyzed for the BTEX compounds. Neither sample of the duplicate pair had detectable concentrations of BTEX; therefore, the RPD could not be calculated.

E.4.1.4. MS/MSDs. The MS/MSD recovery and RPD results were acceptable for both soil and water samples. Two pairs of MS/MSD soil samples were analyzed; BTEX by

the GC method, and VOCs by the GC/MS method. For the addendum, six pairs of MS/MSD soil samples were analyzed for VOCs by the GC/MS method. These samples were evaluated using the three spiking compounds shown in Attachments E-5a and E-5b.

E.4.1.5. Surrogates. The analysis of VOCs in soil and water matrices employed three surrogate compounds: 4-bromofluorobenzene, 1,2-dichloroethane-d4, and toluene-d8. Five soil samples and 16 water samples were analyzed for VOCs. The surrogate recoveries were within the control limits for all soil and water samples, including the addendum samples.

E.4.1.6. Method Blanks. A method blank sample was analyzed with each lot of soil and water samples analyzed for VOCs. These method blank samples had nondetects for all VOC compounds with the following exceptions.

- One soil method blank sample (Lot IUMA) had detectable concentrations of carbon disulfide (at 0.001 µg/g) and methylene chloride (at 0.002 µg/g). None of the associated sample results required qualification based on the detection of these compounds in the method blank sample.

- The method blank sample for the water lot GBKA had detectable concentrations of chloroform and acetone of 0.32 µg/L and 0.98 µg/L, respectively. None of the associated sample results required qualification based on these findings.

- The method blank sample for the water lot XDRB had detectable concentrations of methylene chloride and acetone of 4.5 µg/L and 3.7 µg/L, respectively. None of the associated sample results required qualification based on the detection of these VOC compounds in the method blank sample.

- The method blank sample for the water lot XDPB had detectable concentrations of chloroform, methylene chloride, and acetone (0.43 µg/L, 8.8 µg/L, and 10 µg/L, respectively). Based on these method blank results, one sample, N-143-93 DUP, had a concentration of chloroform of 0.70 µg/L that was qualified as nondetect and flagged with a U.

- Addendum soil lot YGIB had a method blank sample with detectable concentrations of acetone, methylene chloride, and trichlorofluoromethane (0.008 µg/g, 0.004 µg/g, and 0.010 µg/g respectively). None of the associated sample results required qualification based on the detection of these VOC compounds in the method blank sample.

- The method blank samples for addendum soil lot YGJB had a detectable concentration of acetone at 0.003 µg/g. None of the associated sample results required qualification based on the detection of this VOC compound in the method blank sample.

- The method blank samples for addendum soil lot YGKB had a detectable concentration of acetone at 0.008 µg/g. None of the associated sample results required qualification based on the detection of this VOC compound in the method blank sample.

- The method blank samples for addendum soil lot YGLB had a detectable concentrations of methylene chloride and 1,1,2,2-tetrachloroethene at 0.005 µg/g and 0.0006 µg/g, respectively. None of the associated sample results required qualification based on the detection of these VOC compounds in the method blank sample.

- Addendum soil lot YGMB had a method blank sample with detectable concentrations of acetone, methylene chloride, and trichlorofluoromethane (0.009 µg/g, 0.001 µg/g, and 0.019 µg/g respectively). None of the associated sample results required qualification based on the detection of these VOC compounds in the method blank sample.

E.4.1.7. Trip Blanks. Six trip blank samples were shipped with field sample scheduled for the VOC analysis for soil and water. None of the trip blank samples had detectable concentrations of VOCs. During the addendum work, four trip blank samples were shipped with field samples scheduled for VOC analysis. Acetone was detected in each blank and methylene chloride in two of them. This occurrence caused qualification as non-detect for these compounds in three samples that were shipped with these trip blanks (TNEQB-14, SB-48-002A at 2 feet and SB-42-050B at 0.5 feet) . The source of these compounds is suspected to be laboratory contamination.

E.4.1.8. Equipment Blanks. Equipment rinsate blank samples contained no detectable concentrations of VOCs. One equipment rinsate blank collected during the addendum work contained detectable concentrations of chloroform and methylene chloride. Samples collected prior to the equipment rinsate blank had no detectable concentrations of VOCs and the concentrations in the equipment rinsate blank are suspected to be introduced in the laboratory.

E.4.1.9. Source Water. The source water sample and source water duplicate were analyzed for VOCs. Of these, WW-3 DUP had a reported concentration of 0.57 µg/L of 1,2-dichloroethane. This compound was not detected in the original sample of the duplicate pair and was detected near the certified reporting limit of 0.5 µg/L in the duplicate sample. Because the source water had very little contact with the sample, this low concentration of 1,2-dichloroethane does not impose a contamination problem and does not affect the representativeness of the data.

E.4.1.10. Holding Times. The method-required holding times specified in the Phase II DCQAP were met for all soil and water samples analyzed for VOCs.

E.4.2. Semi-Volatile Organic Compounds

E.4.2.1. Laboratory Control Samples. The LCS results are presented in Attachment E-4. USAEC has reviewed and approved all LCS results related to the TEAD-N Phase II RFI.

E.4.2.2. Field Duplicates. Four soil field duplicate pairs and one water field duplicate pair were collected and analyzed for SVOCs. The field duplicate RPD results are provided in Attachments E-5a and E-5b. Six compounds were detected with varying frequencies in the soil field duplicate pairs. RPDs were calculated for detectable concentrations of SVOC compounds in soil samples as summarized in Attachment E-5c. Fifty percent of the calculated RPDs were outside the control limits for three SVOC compounds (fluoranthene, phenanthrene, and pyrene) and all of the calculated RPDs were outside the control limits for two compounds (benzo[k]fluoranthene and di-n-butyl phthalate). These results could be attributed to matrix heterogeneity. No SVOCs were detected in either sample of the water field duplicate sample pair; therefore, the RPD could not be calculated. During the addendum effort six duplicates were collected.

However there were no detectable concentrations of SVOCs; therefore, RPDs could not be calculated.

E.4.2.3. MS/MSDs. Two pair of MS/MSD soil samples were analyzed by GC/MS and evaluated using the 11 spiking compounds shown in Attachments E-5a and E-5b. The RPDs for these samples were acceptable except for three analytes in one pair MS/MSD (sample SB-37-007B at 1.5 feet). These three analytes: 4-chloro-3-methylphenol, 4-nitrophenol, and N-nitroso-di-n-propylamine, were qualified as estimated with a J flag for all detectable and non-detectable concentrations in the field sample associated with the MS/MSD sample. The addendum soil MS/MSDs had acceptable RPDs. The MS/MSD recoveries for these soil samples were all acceptable except for sample SB-37-007B at 1.5 feet. This sample had high recoveries of both spikes for 2,4-dinitrotoluene and one spike for 4-nitrophenol. The sample had no detectable concentrations of these compounds, so no qualification of the associated sample was necessary. The addendum soil MS/MSD recoveries were acceptable except for one sample (SB-45-006A at 10 feet) that had high recoveries for both spikes of pentachlorophenol, one sample (SB-48-001A Dup at 4 feet) that had high recoveries for both spikes of phenol, and one sample (SB-42-050A at 0.5 feet) that had high recoveries for 2,4-dinitritoluene, 4-nitrophenol, and phenol. Two addendum MS/MSD samples had one high spike recovery, each, for 1,2,4-trichlorobenzene (SB-48-001B at 9.5 feet) and 1,4-dichlorobenzene (SB-48-001A Dup at 4 feet). These high spike recoveries do not impact the data; therefore no qualification is necessary.

E.4.2.4. Two pairs of MS/MSD water samples were analyzed and evaluated in the same manner as the soil samples. All the RPD results were acceptable. The recoveries were acceptable except for the MS/MSD pair associated with sample N-142-93. This sample pair had high recoveries for both spikes of 4-chloro-3-methylphenol and a high recovery of one spike of pentachlorophenol. Neither of these analytes were detected in the environmental sample, so no qualification is necessary.

E.4.2.5. Surrogates. All samples analyzed for SVOCs in soil and water matrices were spiked with six surrogate compounds: nitrobenzene-d5, phenol-d5, 2-fluorophenol, 2,4,6-tribromophenol, terphenyl-d14, and 2-fluorobiphenyl. Thirty-seven soil samples and 12 water samples were analyzed for SVOCs. All soil samples had surrogate recoveries within the control limits with two exceptions. Samples SB-42-048A at 0.0 feet and SB-42-049A at 0.0 feet had no recovery of 2,4,6-tribromophenol. Poor

recovery is attributed to sample dilution. The remaining surrogate recoveries for this samples were acceptable; therefore, the data quality was not affected. All 12 water samples had surrogate recoveries within the control limits. Thirty-eight soil samples were analyzed for SVOCs during the addendum work. Five of these samples had surrogate recoveries that were outside the criteria established in the DCQAP. The samples effected include SB-42-050A at 0.5 feet, SB-42-050A Dup at 0.5 feet, SB-42-050B at 1.0 feet, SB-42-051A at 0.5 feet, and SB-42-051B at 2.0 feet. All the surrogate recoveries were high and repeated between the duplicates, illustrating the presence of a matrix effect. However, the impact on the samples is minimal since the recoveries are all high, so no qualifications will be added.

E.4.2.6. Method Blanks. One method blank sample was analyzed with each SVOC sample lot. The method blank samples with detectable concentrations of SVOCs and the resulting qualifications of the data are presented below and are summarized in Attachments E-8a and E-8b.

E.4.2.7. The soil method blank sample for lot HZZA had a detectable concentration of di-n-butylphthalate of 0.12 µg/g. Sixteen samples associated with this analytical lot had detectable concentrations of di-n-butylphthalate that were affected by the method blank contamination. These were qualified as nondetect and flagged with a U. The affected samples and corresponding concentrations of di-n-butylphthalate are summarized below.

Sample	Di-n-butylphthalate Concentration	Flag
SS-37-014 at 0.0 feet	0.58 µg/g	U
SS-37-015 at 0.0 feet	0.10 µg/g	U
SS-37-016 at 0.0 feet	0.86 µg/g	U
SS-37-017 at 0.0 feet	0.95 µg/g	U
SS-37-018 at 0.0 feet	0.22 µg/g	U
SS-37-019 at 0.0 feet	0.37 µg/g	U
SS-37-020 at 0.0 feet	0.21 µg/g	U
SS-37-014 DUP at 0.0 feet	0.29 µg/g	U
SB-37-001A at 0.0 feet	0.35 µg/g	U
SB-37-001B at 1.5 feet	0.38 µg/g	U
SB-37-001C at 3.0 feet	0.25 µg/g	U
SB-37-002A at 0.0 feet	0.10 µg/g	U
SB-37-002B at 1.5 feet	0.38 µg/g	U
SB-37-002C at 3.0 feet	0.43 µg/g	U
SB-37-003A at 0.0 feet	0.43 µg/g	U
SB-37-003B at 1.5 feet	0.10 µg/g	U

- The method blank sample for the soil lot IVLA had 0.32 µg/g of bis(2-ethylhexyl)phthalate. None of the associated samples had detectable concentrations of bis(2-ethylhexyl)phthalate. Therefore, none of the sample results required qualification based on the method blank results.

- The method blank samples for the soil lots IVWA and OEEA had detectable concentrations of diethyl phthalate of 0.06 µg/g and 0.25 µg/g, respectively. None of the sample results required qualification based on the method blank results.

- The water lot GCUA had detectable concentrations of bis(2-ethylhexyl)phthalate and di-n-butylphthalate (at 6.7 µg/L and 0.11 µg/L, respectively). None of the sample results required qualification based on the method blank results.

- The water lot IFMA had detectable concentrations of bis(2-ethylhexyl)phthalate (1.3 µg/L), di-n-butylphthalate (0.05 µg/L), butylbenzylphthalate (0.13 µg/L), and phenol (0.37 µg/L). None of the associated sample results required qualification based on these method blank concentrations.

- The water lot IFTA had detectable concentrations of bis(2-ethylhexyl)phthalate and phenol at 5.4 µg/L and 1.83 µg/L, respectively. None of the associated sample results required qualification based on the method blank results.

- The water lot WDFB had a detectable concentration of 1,2-epoxycyclohexane at 1.0 µg/L. None of the associated samples had detectable concentrations of 1,2-epoxycyclohexane; therefore, no qualification was required.

- The water lot WDHA had a detectable concentration of phenol at 0.46 µg/L. None of the associated sample results required qualification based on the detection of phenol in the method blank sample.

- The method blank samples for the soil addendum lots OELB, OEOB, and OEPB had detectable concentrations of bis(2-ethylhexyl)phthalate of 0.08 µg/g, 0.14 µg/g, and 0.04 µg/g, respectively. None of the sample results required qualification based on the method blank results.

- The method blank sample for the soil addendum lot OEKB had detectable concentrations of bis(2-ethylhexyl)phthalate and di-n-butylphthalate of 0.11 µg/g and 0.03 µg/g, respectively. None of the sample results required qualification based on the method blank results.

- The method blank sample for the soil addendum lot OEMB had detectable concentrations of bis(2-ethylhexyl)phthalate and di-n-butylphthalate of 0.04 µg/g and 0.02 µg/g, respectively. None of the sample results required qualification based on the method blank results.

E.4.2.7. Equipment Blanks. Neither the equipment rinsate blank samples nor the source water duplicate pair contained detectable concentrations of SVOCs. The addendum equipment rinsate blank samples had no detectable concentrations of SVOCs.

E.4.2.8. Source Water. The source water sample and duplicate sample were analyzed for SVOCs. No SVOC compounds were detected in either sample.

E.4.2.9. Holding Times. The method-required holding times specified in the Phase II DCQAP were met for all soil and water samples analyzed for SVOCs.

E.4.3. Organochlorine Pesticides

E.4.3.1. Laboratory Control Samples. The LCS results are presented in Attachment E-4. USAEC has reviewed and approved all LCS results related to the TEAD-N Phase II RFI.

E.4.3.2. Field Duplicates. Three soil field duplicate pairs and one water field duplicate pair were collected and analyzed for OCPs. RPDs were calculated for the compounds detected in the soil samples as summarized in Attachment E-5a. All calculated RPDs were within the control limits, indicating acceptable sampling and analytical precision. No OCP compounds were detected in either sample of the water field duplicate sample

pair; therefore, the RPD was not calculated. Six duplicate samples were collected as part of the addendum work. However, there were no detectable concentrations, so RPDs were not calculated.

E.4.3.3. MS/MSDs. Three pairs of MS/MSD soil samples were analyzed by GC and evaluated using the 10 spiking compounds shown in Attachments E-6a and E-6b. The RPDs for these samples were all acceptable. The recoveries for all spiking compounds were also acceptable with the exception of isodrin in every pair of spiked samples. In every instance, both recoveries were low by 17 to 27 percentage points, which could indicate a matrix effect. The detectable and nondetectable concentrations for these analytes are qualified as estimated with low bias and flagged with a J. The laboratory should consider establishing new control limits if this low recovery is persistent across projects. The five MS/MSD samples collected and analyzed as part of the addendum work had acceptable recoveries and RPDs.

E.4.3.4. One pair of MS/MSD water samples was analyzed and evaluated in the same manner as the soil samples. The RPD for this pair was acceptable. The recoveries for all analytes except isodrin were acceptable. The isodrin problem is similar to that described for soil; in which recoveries low. The detected and nondetectable concentrations for this analyte will be qualified as estimated with low bias and flagged with a J.

E.4.3.5. Surrogates. The analysis of OCPs in soil and water matrices employed two surrogate compounds: decachlorobiphenyl (the primary surrogate compound) and tetrachloro-m-xylene (the secondary surrogate compound). Tetrachloro-m-xylene recoveries were evaluated only in the instance that the primary surrogate recovery was outside the control limits. Forty soil samples and 11 water samples were analyzed for OCPs. The primary surrogate, decachlorobiphenyl, had recoveries outside the control limits in three soil samples. Two of these samples also had secondary surrogate recoveries outside the control limits. These samples and the associated surrogate recoveries and control limits are summarized below:

Sample	Surrogate Compound	% Recovery	Limits
SB-34-007A at 0.0 ft	Decachlorobiphenyl	16	32-156
	Tetrachloro-m-xylenes	64	67-119
SB-34-007B at 1.5 ft	Decachlorobiphenyl	21	32-156
	Tetrachloro-m-xylenes	66	67-119
SB-34-007C at 3.0 ft	Decachlorobiphenyl	19	32-156
	Tetrachloro-m-xylenes	70	67-119

E.4.3.6. Because sample SB-34-007C had an acceptable secondary surrogate recovery, the OCP results for this sample are not affected by the low recovery of the primary surrogate. Samples SB-34-007A at 0.0 feet and SB-34-007B at 1.5 feet had low recoveries of both the primary and secondary surrogate indicating a low response and a negative bias of the associated data. As a result, the detectable and nondetectable OCP results for samples SB-34-007A at 0.0 feet and SB-34-007B at 1.5 feet are qualified as estimated with a low bias and flagged with a J. All water samples analyzed for OCPs had acceptable surrogate recoveries. All primary and secondary surrogates had acceptable recoveries for the addendum work.

E.4.3.7. Method Blanks. One method blank sample was analyzed with each lot of soil and water samples analyzed for OCPs. One soil method blank sample had detectable concentrations of alpha-chlordane and gamma-chlordane (at 0.001 µg/g and 0.003 µg/g, respectively). None of the associated field samples had detectable concentrations of these OCP compounds. Therefore, the data were not affected and qualification was not necessary. None of the water method blank samples had detectable concentrations of OCP compounds. Four lots of samples during the addendum work had detectable concentrations of aldrin, dieldrin, endosulfan A, endrin, and heptachlor. None of the soil samples had detectable concentrations of these compounds, so no qualifications were needed.

E.4.3.8. Equipment Blanks. Neither the equipment rinsate blank samples, nor the source water duplicate pair contained detectable concentrations of OCP compounds. None of the equipment rinsate blanks collected during the addendum had detectable concentrations of OCP compounds.

E.4.3.9. Holding Times. The method-required holding times specified in the Phase II DCQAP were met for all soil and water samples analyzed for OCPs with two exceptions: The soil samples SB-34-007A at 0.0 feet and SB-34-004C at 3.0 feet were extracted one and two days beyond the holding time, respectively. The associated data were flagged appropriately by the USAEC chemistry branch to reflect the missed holding times. These data are qualified as estimated and possibly negatively biased. All sample holding times were met during the addendum work.

E.4.4. Dioxin/Furans

E.4.4.1. Laboratory Control Samples. The LCS results are presented in Attachment E-4. USAEC has reviewed and approved all LCS results related to the TEAD-N Phase II RFI.

E.4.4.2. Field Duplicates. Three soil field duplicate pairs were collected and analyzed for dioxins and furans. RPDs were calculated for the compounds detected in the soil samples; these results are summarized in Attachment E-5a. The field duplicate results are summarized below:

E.4.4.3. Sample SB-37-006A at 0.0 feet had detectable concentrations of 24 dioxin and furan parameters in both samples of the duplicate pair. The calculated RPDs were within the control limits for all parameters with three exceptions. The RPDs for total tetrachlorodibenzofurans (TCDFs,) 2,3,7,8-TCDF, and total pentachlorodibenzofurans (PCDFs) were 58 percent, 73 percent, and 67 percent, respectively. These results are attributed to matrix heterogeneity and do not affect the data quality.

E.4.4.4. Sample SB-37-006C at 3.0 feet had detectable concentrations of 14 dioxin and furan parameters in both samples of the duplicate pair. The calculated RPDs were within the control limit of 50 percent for all parameters with exceptions summarized below:

Parameter	RPD (%)	Control Limit (%)
Total TCDFs	164	50
Total HXCDFs	137	50
Total HPCDFs	65	50
1,2,3,4,6,7,8-HPCDF	61	50
1,2,3,4,7,8,9-HPCDF	88	50
Total TCDD	187	50

Total HXCDDs	81	50
1,2,3,4,7,8-HXCDD	107	50
1,2,3,6,7,8-HXCDD	101	50
1,2,3,7,8,9-HXCDD	120	50
Total HPCDDs	54	50
1,2,3,4,6,7,8-HPCDD	56	50

These results are attributed to matrix heterogeneity and do not impact the data quality. The one duplicate collected during the addendum work for dioxin/furans could not have RPDs calculated since the duplicate had no detectable concentrations.

E.4.4.5. MS/MSDs. MS/MSD samples were not required for evaluation.

E.4.4.6. Internal Standards. The dioxin and furan samples were not spiked with surrogate compounds; therefore, the internal standards, which function similarly to surrogates, were used for evaluation. The internal standard employed for this evaluation was C13-2,3,7,8-TCDD. The internal standard recovery results are provided in Attachments E-7c and E-7d. All recoveries were within the established control limits, indicating acceptable accuracy. All internal standards for the addendum work were within the acceptable ranges.

E.4.4.7. Method Blanks. One method blank sample was analyzed with each lot of soil and water dioxin/furan samples. None of the method blank samples had detectable concentrations of dioxin/furan compounds. There were no detectable concentrations of dioxins/furans in method blanks for the addendum work, either.

E.4.4.8. Equipment Rinsate Blanks. Equipment rinsate blank samples had no detectable concentrations of dioxins or furans for the 1993 effort or the addendum work.

E.4.4.9. Source Water. The source water sample and its duplicate were analyzed for dioxins and furans. No dioxin and furan compounds were detected in either sample.

E.4.4.10. Holding Times. The method-required holding times specified in the Phase II DCQAP were met for all soil, water, and addendum samples analyzed for dioxin/furans.

E.4.5. Explosives

E.4.5.1. Laboratory Control Samples. The LCS results are presented in Attachment E-4. USAEC has reviewed and approved all LCS results related to the TEAD-N Phase II RFI.

E.4.5.2. Field Duplicates. Eleven soil field duplicate pairs and one water field duplicate pair were collected and analyzed for explosives. None of these samples had detectable concentrations of explosives compounds. Therefore, the RPDs could not be calculated. One soil duplicate was collected for the addendum work, but no detectable concentrations were reported, so no RPDs were calculated.

E.4.5.3. MS/MSDs. Nine pairs of MS/MSD soil samples were analyzed by high performance liquid chromatography (HPLC) and evaluated using the four spiking compounds listed in Attachments 4-1 and 4-2. All RPDs were acceptable. The recoveries were acceptable in all nine pairs with the exception of one spike of 2,4,6-TNT in sample SB-42-015D at 77.0 feet. This sample's 2,4,6-TNT recovery was 71 percent while the lower recovery limit is 72 percent. The nondetect result will be qualified as estimated and biased low using the J flag. Two soil MS/MSD samples were analyzed for the addendum work and both had acceptable recoveries and RPDs.

E.4.5.4. Three pairs of MS/MSD water samples were analyzed and evaluated in the same manner as the soil samples. All the RPDs were acceptable. The recoveries were acceptable for every spike compared except 2,4-DNT in sample SW-21-001. The 2,4-DNT spike had a high recovery of 102.6 percent, while the upper limit was 98.2 percent. There was no detectable concentration for 2,4-DNT in this sample, so no qualification is necessary.

E.4.5.5. Surrogates. No surrogates were utilized for the analysis of explosives in soil. The analysis of explosives in the water matrix employed one surrogate compound: 3,4-DNT. Fourteen water samples were analyzed for explosives. The recoveries of 3,4-DNT were within the control limits for all water samples.

E.4.5.6. Method Blanks. One method blank sample was analyzed with each soil and water lot analyzed for explosives. The method blank sample for the soil lot NCBA had a detectable concentrations of 1,3-DNB at 0.081 µg/g. None of the associated samples had detectable concentrations of explosives compounds; therefore, qualification of the sample data was not required. The method blank samples for two water lots had

detectable concentrations of explosive compounds. Lot THAA had concentrations of 1,3-DNB (at 0.005 µg/L) and lot THAB had concentrations of 1,3-dinitrobenzene and 1,3,5-TNB (at 0.056 µg/L and 0.092 µg/L, respectively). None of the associated samples had detectable concentrations of these explosives compounds; therefore, qualification of the data was not required. None of the method blanks for the addendum work had detectable concentrations of target analytes.

E.4.5.7. Equipment Rinsate Blanks. Neither the equipment rinsate blank samples nor the source water duplicate pair had detectable concentrations of explosives. The equipment rinsate blanks for addendum had no detectable concentrations of target analytes.

E.4.5.8. Source Water The source water sample and its duplicate were analyzed for explosives. No explosive compounds were detected in either sample.

E.4.5.9. Holding Times. The method-required holding times specified in the Phase II DCQAP were met for all soil and water samples analyzed for explosives, with one exception. The soil sample SB-42-018A at 0.0 feet was extracted 22 days beyond the holding time. The associated data have been flagged appropriately by the USAEC chemistry branch to reflect the missed holding times. These data are qualified as rejected, and should be used for qualitative purposes only. All explosive holding times for the addendum were met.

E.4.6. Total Petroleum Hydrocarbons (TPH) as Gas and Diesel

E.4.6.1. LCSs. The LCS results are presented in Attachments E-4. USAEC has reviewed and approved all LCS results related to the TEAD-N Phase II RFI.

E.4.6.2. Field Duplicates. Field duplicate pairs were not collected for TPH as gas and diesel due to the small number of samples analyzed for this parameter; therefore, sampling and analytical precision was not assessed for the TPH analysis using this type of QC sample. Five duplicate pairs were collected and analyzed during the addendum work but no detectable concentrations were reported. Therefore; no RPDs were calculated.

E.4.6.3. MS/MSDs. MS/MSD samples were not required. Four MS/MSD soil samples were collected and analyzed by GC during the addendum work. The spiking compounds utilized were gas and diesel depending on which hydrocarbon was being quantitated. The recoveries and RPDs were acceptable for all four samples.

E.4.6.4. Surrogates. The analysis of TPH as gas and TPH as diesel in soil and water matrices employed one surrogate compound, pentacosane. Four soil samples and one water sample were analyzed. The recoveries of pentacosane were within the control limits for all soil and water samples. The surrogate recoveries for all the addendum samples were acceptable.

E.4.6.5. Method Blanks. One method blank sample was analyzed with each lot of soil and water samples analyzed for TPH as gas and diesel. None of the method blank samples had detectable concentrations of TPH. Nor did any of the addendum method blanks have detectable concentrations of TPH as gas or diesel.

E.4.6.6. Equipment Rinsate Blanks. Equipment rinsate blank samples has no detectable concentrations of TPH as gas or diesel. Addendum equipment rinsate blank samples has no detectable concentrations of TPH as gas or diesel.

E.4.6.7. Source Water. The source water sample and its duplicate were analyzed for TPH as gas and diesel. No TPH compounds were detected in either sample.

E.4.6.8. Holding Times. The method-required holding times specified in the Phase II DCQAP were met for all soil and water samples analyzed for TPH as gas and diesel. The TPH holding times were met for the addendum work, also.

E.4.7. Metals

E.4.7.1. LCSs. The LCS results are presented in Attachment E-4. USAEC has reviewed and approved all LCS results related to the TEAD-N Phase II RFI.

E.4.7.2. Field Duplicates. Twenty soil field duplicate pairs and one water field duplicate pair were collected and analyzed for metals. RPDs were calculated for soil samples as summarized in Attachment 3-3. RPDs were calculated from 0 to 20 times for the metal analytes, depending on the frequency of detectable concentrations in the field

duplicate samples. The percentages of calculated RPDs that exceeded the control limit range from 11 percent for cobalt to 100 percent for selenium and mercury, as shown on Attachment E-5c. These percentages give an indication of the degree of heterogeneity for each analyte. The metals with the highest percentage of RPDs that exceeded control limits are listed below:

- Selenium (100 percent)
- Mercury (100 percent)
- Aluminum (65 percent)
- Potassium (65 percent)
- Iron (60 percent)
- Chromium (53 percent)

E.4.7.3. The calculated RPDs for the water field duplicate pair exceeded the control limit for selenium with an RPD of 27 percent. This result has no effect on the data quality. During the addendum work five duplicate samples were collected and analyzed with results similar to those indicated above. The majority of the RPDs exceeded the acceptance limit indicating large amounts of matrix heterogeneity.

E.4.7.4. MS/MSDs. Arsenic and selenium were analyzed by graphite furnace atomic absorption (GFAA) in soil. These two metals plus lead and thallium were analyzed by GFAA in water samples (the results are discussed below following the soil discussion). There were 17 pair of MS/MSD soil GFAA samples. The samples were spiked with arsenic and selenium and the resulting recoveries and RPDs are shown in Attachments E-5a and E-5b. The selenium soil RPDs all were acceptable.

E.4.7.5. The arsenic soil RPD results all were acceptable except for two cases. In sample SB-BK-012B (at 3.0 feet), the RPD was 28 percent while the limit is 24 percent. Sample SB-42-017E (at 92.0 feet) had a 84 percent RPD (24 percent limit). Both of these samples had detectable concentrations of arsenic, which will be qualified as estimated using a J.

E.4.7.6. The arsenic soil recoveries were acceptable except in nine instances. For three samples both spikes were high; samples affected include SB-20-018 at 0 feet, SB-20-001 at 0 feet, and SB-42-028A at 0 feet. The other six samples had one of the two spikes outside the acceptance limits. The samples whose recoveries exceeded the 120 percent

limit include: SB-20-001B at 1.5 feet, SB-20-016A at 0 feet, and SB-20-016B at 1.5 feet. All these samples had detectable concentrations of arsenic which were qualified as estimated (biased high) and flagged with a J. The remaining three had the low recoveries, below the 72 percent recovery limit including: SB-BK-012B at 3.0 feet, SB-42-017E at 92.0 feet, and SB-42-033ADUP at 0.0 feet. These samples also had detectable concentrations of arsenic, but will require qualification as estimated and biased low using a J.

E.4.7.7. The selenium soil recoveries for this project were very poor, which is not unusual for selenium because it is historically difficult to recover. Selenium recoveries were low (below the 71 percent limit, with ranges of recovery from 18.5 percent to 68.4 percent) in 16 of the 17 MS/MSD samples. In 15 cases, both spikes were outside the acceptance limits; in the remaining instance only one spike was low. The following samples will be qualified as estimated and biased low for both detectable and non detectable concentrations of selenium using a J flag.

SB-BK-012B at 3.0 feet	SB-42-022B at 3.0 feet	SB-34-003C at 11.0 feet
SB-20-002A at 0.0 feet	SB-20-018 at 0.0 feet	SB-20-001A at 0.0 feet
SB-20-001B at 1.5 feet	SB-20-016A at 0.0 feet	SB-20-016B at 1.5 feet
SB-42-017E at 92.0 feet	SB-42-028A at 0.0 feet	SB-42-028B at 3.0 feet
SB-42-033ADUP at 0.0 feet	SB-42-037ADUP at 0.0 feet	SB-42-044B at 5.0 feet
SB-BK-013A at 0.0 feet		

E.4.7.8. The selenium analysis is another instance where the laboratory should consider re-evaluating the acceptance criteria to match historical recovery data. The addendum work included four MS/MSD samples that had results similar to those described above. Selenium was consistently low and arsenic high in both spikes of one sample (SB-42-050A at 0.5 feet) and low in one spike of another (SB-48-002B). The RPDs were all acceptable except for arsenic in sample SB-42-050A at 0.5 feet which was high. The results of the qualifications based on this analysis are detailed in Table E-3.

E.4.7.9. One MS/MSD water sample was analyzed for the four GFAA metals. All four metals (arsenic, lead, selenium, and thallium) had acceptable RPDs. Thallium was the only metal of the four that had unacceptable recoveries. Two thallium recoveries were below the 74 percent lower recovery limit (recoveries were both 51 percent). The spiked

sample (SW-21-001) had no detectable concentration of thallium and is qualified as estimated with low bias using a J flag.

E.4.7.10. Mercury was analyzed by cold vapor atomic absorption (CVAA) in both soil and water matrices. Mercury was spiked into 17 soil samples and one water sample to evaluate the analyte recovery from these matrices.

E.4.7.11. For the seventeen mercury soil samples, the RPDs were acceptable except for one in sample SB-42-028A at 0 feet. The maximum acceptable RPD limit is 21 and this sample had a 28 percent recovery. The sample had no detectable concentration, so no qualification is necessary. The mercury RPDs for the four addendum MS/MSDs were all acceptable.

E.4.7.12. The recoveries were all acceptable for all samples except two. One sample, SD-21-001 at 0.0 feet, had both spikes below the lower limit of 83 percent. The other sample, SB-BK-011A at 0.0 feet had one spike below the lower limit. Both of these samples had no detectable concentrations of mercury and have been qualified as estimated with low bias using a J flag. One of the four addendum MS/MSDs had unacceptable recoveries. Sample SB-42-050A at 0.5 feet had low recoveries for both spikes; mercury was not detected in this sample and will be qualified as estimated with low bias using a J flag.

E.4.7.13. The one water MS/MSD had acceptable RPD and recovery percentages for mercury.

E.4.7.14. The 13 remaining metals (antimony, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, silver, thallium, vanadium, and zinc) were analyzed by inductively coupled plasma atomic absorption (ICP). The ICP metals in water were antimony, barium, beryllium, cadmium, chromium, cobalt, copper, nickel, silver, vanadium, and zinc.

E.4.7.15. There were 16 pair of MS/MSD soil ICP samples. These samples were spiked with all the target metals and the resulting recoveries and RPDs are shown in Attachments E-5a and E-5b.

E.4.7.16. There were seven metals in five samples that had RPDs above the maximum limit. The samples corresponding metals are listed below (four addendum samples are also included).

- SB-42-042B at 5.0 feet had a 31 percent RPD for chromium. The maximum acceptable limit is 15 percent.

- SB-42-044A at 0.0 feet had a 30 percent RDP for antimony. The maximum acceptable limit is 15 percent.

- SB-42-034B at 5.0 feet had four metals with unacceptable RPDs. These were barium with an RPD of 33 percent (the limit is 10 percent), chromium with an RPD of 41 percent (the limit is 15 percent), lead with an RPD of 22 (the limit is 15 percent), and nickel with an RPD of 15 (the limit is 14 percent).

- SB-20-002B at 1.5 feet had a 15 percent RPD for vanadium. The maximum acceptable limit is 9 percent.

- SB-20-016A at 0 feet had four metals with unacceptable RPDs. These were barium with an RPD of 34 percent (the limit is 10 percent), copper with an RPD of 16 percent (the limit is 12 percent), lead with an RPD of 19 (the limit is 15 percent), and zinc with an RPD of 28 (the limit is 18 percent).

- Addendum sample SB-45-006A at 10 feet had one metal with a high RPD. Barium had an RPD of 16 percent while the upper limit is 10.

- Addendum sample SB-48-002B at 10 feet had two metals with high RPDs. These metals were barium and chromium. Barium was 19 percent while chromium was 27, the upper limits were 10 and 15 respectively.

- Addendum sample SB-42-050A at 0.5 feet appears to have had extreme matrix effects or large laboratory spiking errors. Five metal had very high RPDs, these metals and their respective RPDs and limits (listed in that order) are: barium, 73/10; chromium, 21/15; lead, 59/15; nickel, 16/14; and zinc, 63/18.

E.4.7.17. The detectable and non detectable concentrations in each associated environmental sample for each of these analytes in these samples will be qualified as estimated with a J flag.

E.4.7.18. The soil MS/MSD had acceptable recoveries for all analytes except for eight metals in 13 samples. These nonconformances are described below (four addendum samples are also included).

- SB-42-018ADUP at 0.0 feet had a single high recovery for barium. The recovery was 106.3 percent while the limits were 86-106 percent.

- SB-42-021BDUP at 4.0 feet had a single high recovery for barium. The recovery was 109 percent while the limits were 86-106 percent.

- SB-42-028A at 0.0 feet had both of the antimony spikes lower than acceptable limits of 79-109 percent (76 percent and 77 percent).

- SB-42-028B at 3.0 feet had a single low recovery for cobalt at 85 percent (limits are 85-105 percent) and a single low recovery for vanadium at 86 percent (limits are 87-105).

- SB-42-042B at 5.0 feet had two low recoveries for antimony both at 77 percent (limits are 79-109 percent) and a single high recovery for chromium at 120 percent (limits are 79-109 percent).

- SB-42-044A at 0.0 feet had both antimony and both barium spikes outside the acceptable ranges. The two antimony spikes were both low at 40 percent and 53 percent while the limits are 79-109 percent. The barium spikes were both high at 117 percent and 113 percent while the limits were 86-106 percent.

- SB-42-034B at 5.0 feet had three individual metals with one spike outside the acceptance limits. Barium had one low spike recovery at 74 percent, the limits are 86-106 percent. One nickel spike had an unacceptable recovery of 77 percent, the limits are 78-106 percent. One vanadium spike had a low 82 percent recovery, the limits are 87-105 percent.

- SB-20-002A at 0.0 feet had both antimony and both barium spikes outside the acceptable ranges. The two antimony spikes were both low at 64 percent and 56 percent while the limits are 79-109 percent. The two barium spikes were both high at 109 percent and 122 percent while the limits were 86-106 percent.

- SB-20-002B at 1.5 feet had both antimony and both barium spikes outside the acceptable ranges. The two antimony spikes were both low at 71 percent and 62 percent while the limits are 79-109 percent. The two barium spikes were both high at 135 percent and 125 percent while the limits were 86-106 percent.

- SB-20-016A at 0.0 feet had three metals that each had a single spike outside the acceptance limits. Barium had one low spike recovery at 58 percent, the limits are 86-106 percent. One nickel spike had an unacceptable recovery of 75 percent, the limits are 78-106 percent. Lastly, one zinc spike had a high 113 percent recovery, the limits are 76-112 percent.

- SS-BK-001DUP at 0.0 feet had a single high recovery for barium. The recovery was 108 percent while the limits were 86-106 percent.

- SB-42-016C at 42.0 feet had one metal (antimony) with both spikes outside the limits and two metals (barium and vanadium) with one spike outside the acceptance limits. The two antimony spikes were both low at 61 percent and 68 percent while the limits are 79-109 percent. The barium spike was both low at 85 percent while the limits were 86-106 percent. The vanadium spike was low at 85 percent while the limits were 87-105 percent.

- SB-20-015B at 1.5 feet had both of the antimony spike recoveries lower than the acceptable limits of 79-109 percent. The recoveries were 73 percent and 76 percent.

- Addendum sample SB-48-002B at 10 feet had a single low spike recovery of 77 percent for barium. The lower acceptance limit is 86 percent.

- Addendum sample SB-42-050A at 0.5 feet may have extreme matrix interference or laboratory spiking errors since six metals had both spikes outside the acceptance ranges. The metals, the recoveries, and acceptance limits (in parentheses) are: antimony, -79/-42 (79-109); barium, 785/363 (86-106); copper, 1364/-2198 (84/108); lead 6469/3537 (79-109); silver, 70/65 (73-107); zinc, 224/117 (76-112).

- Addendum sample SB-48-001B at 9.5 feet had two metals that had slightly low recoveries. One spike for cobalt had a 84 percent recovery while the acceptable range is 85-105. Vanadium also had a single low spike recovery; the recovery was 85 percent while the lower acceptable limit is 87 percent.

E.4.7.19. The samples and corresponding metals cited above will be qualified as estimated with a J flag for all detectable and non detectable concentrations when the recoveries were low. All the detectable concentrations for those samples that had high recoveries will be qualified as estimated with a J flag.

E.4.7.20. One MS/MSD pair was analyzed for the water matrix and all ICP metals had acceptable RPDs and recoveries.

E.4.7.21. Method Blanks. One method blank sample was analyzed with each lot of soil and water samples for metals. The method blank samples, detectable concentrations of metal analytes, and the effect on associated data are summarized below and presented in tabular form in Attachments E-8a and E-8b.

- Arsenic was detected in the method blank for lot ISGA at a concentration of 0.327 µg/g. All of the associated samples had detectable concentrations of arsenic. All but one of these samples had concentrations greater than five times the concentration detected in the method blank sample and were not affected. Sample SB-42-040A at 0.0 feet had a arsenic concentration of 1.46 µg/g. This result is qualified as nondetect and flagged with a U.

- All nine lots and two addendum lots for ICP metals in soils had detectable concentrations in the method blanks of the following metals: aluminum, barium, calcium, iron, potassium, magnesium, manganese, and sodium. These metals were detected at consistent levels and are characteristic of the matrix

employed for the method blank analysis. These results have no effect on the data quality of the associated samples.

- Zinc was detected in the water method blank sample for lot EVVA at 16.5 µg/L. The associated samples (WW-3 and WW-3 DUP) had zinc concentrations of 30.6 µg/L and 25.6 µg/L, respectively. The zinc results for WW-3 and WW-3 DUP are therefore qualified as nondetect and flagged with a U.

- The water lot ZFGA had a detectable concentration of calcium at 107 µg/L. None of the associated environmental samples required qualification based on this concentration.

- The water lot ZFTA had a detectable concentration of zinc at 11.5 µg/L. None of the associated batch samples required qualification based on this concentration.

- Addendum lot UBVB had detectable concentrations of copper, nickel, zinc, chromium, and vanadium. Copper was detected at 0.693 µg/g and did not result in any sample qualification. Nickel was detected at 0.699 µg/g and did not cause any sample qualification. Zinc was detected at 1.94 µg/g and resulted in non-detect, U, qualifiers for seven samples in the lot including: EP-42-002B at 6 feet, SB-45-002B at 12 feet, SB-45-005A at 12 feet, SB-45-006A at 10 feet, SB-45-006B at 11.5 feet, SB-45-008A at 7 feet, and SB-45-008B at 10 feet. Chromium was detected at 0.48 µg/g and resulted in no sample qualification. Vanadium was detected at 1.02 µg/g and resulted in no sample qualification.

- Addendum lot UBWB had detectable concentrations of zinc and vanadium. Zinc was detected at 2.08 µg/g and four samples in the lot being qualified as non-detect. These samples include: SB-45-012A at 8.5 feet, SB-45-012B at 10.5 feet, SB-45-014A at 9 feet, and SB-48-001B at 9.5 feet. Vanadium was detected at 1.44 µg/g and resulted in non-detect, U, qualifiers for nine samples which include: SB-42-050A at 0.5 feet, SB-42-051A at 0.5 feet, SB-45-012A at 8.5 feet, SB-45-012B at 10.5 feet, SB-45-013A at 7 feet, SB-45-013B at

9 feet, SB-45-014A at 9 feet, SB-45-014B at 10.5 feet, and SB-48-001B at 9.5 feet.

E.4.7.22. Source Water. The source water sample (WW-3) and its duplicate (WW-3 DUP) were analyzed for metals. Seven metals were detected in both samples: barium (at 87.6 and 60.6 µg/L), calcium (at 143,000 and 101,000 µg/L), magnesium (at 54,000 and 37,800 µg/L), potassium (at 5,460 and 4,470 µg/L), sodium (134,000 and 93,800 µg/L), and zinc (at 30.6 and 25.6 µg/L). Two additional analytes were detected in sample WW-3 only: chromium (at 6.38 µg/L) and copper (at 13.8 µg/L). The detectable concentrations of zinc are qualified as nondetect due to the associated method blank concentrations, as discussed above. Because the source water had very little contact with the samples, these concentrations do not impose a contamination problem and do not affect the representativeness of the data.

E.4.7.23. Equipment Rinsate Blanks. Equipment rinsate blanks contained various combinations of metal concentrations as listed in Attachment E-10. Those analytes described above in the source water discussion have been eliminated from this evaluation since they are considered "background" concentrations in the water used to collect these QC samples. The remaining analytes evaluated include aluminum, chromium, copper, iron, lead, manganese, vanadium and zinc. Although aluminum and iron are ubiquitous in soil, they were not excluded from this evaluation because they are primary indicators of the effectiveness of the decontamination procedures. If the decontamination procedures are capable of decreasing the concentrations of these two metals, then it should be assumed to be extremely effective in removing all other contaminants. The samples associated with these blanks were evaluated in a similar manner to the method and trip blanks, through use of the Functional Guidelines five and ten times contaminant rules. Therefore, the following samples were evaluated for equipment rinsate blank samples:

- SB-20-015C at 3 feet was associated with TNEQB-1, which had detectable concentrations of aluminum, chromium, copper, iron, and manganese. The chromium and copper results in this sample are both qualified as non-detect with a U because they have concentrations less than five times the concentration in the equipment rinsate blank sample and may be a result of carry-over.

- SB-20-001C at 3 feet was associated with TNEQB-2, which had detectable concentrations of copper, iron, and manganese. The copper result in this sample is qualified as non-detect with a U because it may be a result of carry-over and has a concentration less than five times the concentration in the equipment rinsate blank sample.

- SB-34-001E at 20 feet was associated with TNEQB-5, which had detectable concentrations of iron and manganese. The manganese result in this sample is qualified as non-detect with a U because it may be a result of carry-over and has a concentration less than five times the concentration in the equipment rinsate blank sample.

- SB-42-022D at 10 feet was associated with TNEQB-7, which detectable concentrations of iron and manganese. No qualifications were required based on these concentrations.

- SB-42-028D at 10 feet is associated with TNEQB-8, which had detectable concentrations of copper, iron, manganese, lead, and vanadium. The copper and vanadium results in this sample are both qualified as non-detect with a U because they may be a result of carry-over and have concentrations less than five times the concentration in the equipment rinsate blank sample.

- SB-42-016A at 7 feet is associated with TNEQB-10 which had detectable concentrations of copper, iron, manganese, and lead. The copper result in this sample is qualified as non-detect with a U because it may be a result of carry-over and has a concentration less than five times the concentration in the equipment rinsate blank sample.

- SB-42-016D at 77 feet is associated with TNEQB-11, which had detectable concentrations of chromium, copper, iron, manganese, lead, and zinc. The chromium, copper, and zinc results in this sample are all qualified as non-detect with a U because they may be a result of carry-over and have concentrations less than five times the concentration in the equipment rinsate blank sample.

- SB-42-048B at 5 feet is associated with TNEQB-12, which had detectable concentrations of copper, iron, and manganese. The copper result in this sample is qualified as non-detect with a U because it may be a result of carry-over and has a concentration less than five times the concentration in the equipment rinsate blank sample.

- Well T-7 at 322 feet is associated with TNEQB-13 which had detectable concentrations of chromium, iron, and manganese. All three of these metals are qualified as non-detect with a U because it may be a result of carry-over and has a concentration less than five times the concentration in the equipment rinsate blank sample.

E.4.7.24. During the addendum work the samples that followed the equipment rinsate blanks were not tracked so this analysis could not be performed.

E.4.7.25. Holding Times. The method required holding times specified in the Phase II DCQAP were met for all soil and water samples analyzed for metals.

E.4.8. Water Quality Parameters

E.4.8.1. Field Duplicates. One field duplicate pair of water samples was collected and analyzed for water quality parameters including alkalinity, sulfate, chloride and total dissolved solids. The calculated RPDs were within the control limits indicating acceptable sampling and analytical precision.

E.4.8.2. Method Blanks. One method blank sample was analyzed with each batch of samples analyzed for water quality parameters. Alkalinity was detected in the method blank samples for lots TEJF and TEQH (at 5000 µg/L and 3000 µg/L, respectively). None of the environmental sample results required qualification based on the concentrations detected in the method blank samples. Total dissolved solids were detected in the method blank sample for lot TEYG at a concentration of 2000 µg/L. No environmental samples required qualification based on the levels detected in the method blank sample.

E.4.8.3. Holding Times. The method-required holding times specified in the Phase II DCQAP were met for all soil and water samples analyzed for water quality parameters

with the following exceptions. Three water samples had alkalinity and sulfate holding times outside the holding time limits as summarized below.

Sample ID	Analysis	Nonconformance
N-142-93	Sulfate/Chloride	Analyzed 18 days beyond holding time
	Alkalinity	Analyzed 31 days beyond holding time
N-143-93	Sulfate/Chloride	Analyzed 17 days beyond holding time
	Alkalinity	Analyzed 30 days beyond holding time
T-7	Sulfate/Chloride	Analyzed 17 days beyond holding time
	Alkalinity	Analyzed 30 days beyond holding time

E.4.8.4. These data are qualified as rejected, and should be used for qualitative purposes only.

E.4.9. Moisture

E.4.9.1. All 23 soil field duplicate pairs were analyzed for moisture. The calculated RPDs were within the control limits with one exception. Sample SB-20-019A at 0.0 feet had an RPD of 25 percent with a control limit of 20 percent. This result is attributed to matrix heterogeneity and does not affect the data quality.

E.5. ADDITIONAL QUALITY CONTROL DOCUMENTATION

E.5.0.1. As requested by the Utah Department of Environmental Quality, four attachments are included to provide additional information on the environmental samples collected and some of the analytical procedures. Attachment E-12 includes a report of samples that required dilution. Samples were selected for this data report if they had a dilution factor greater than one. The report in Attachment E-12 is arranged by matrix, and includes the laboratory and sample identifications, depth, date sampled, test method, compound name, concentration, flagging code, data qualifier, and lot number. This report was generated from the IRDMIS by the Montgomery Watson data manager.

E.5.0.2. Attachment E-13 is a report generated by ESE that provides that percent moisture for each soil and sediment sample. The information included on this report is laboratory and sample identification, date and time sampled, depth, and percent moisture.

E.5.0.3. Attachment E-14 is a summary of the laboratory instrument calibration frequency.

E.5.0.4. Attachment E-15 includes copies of laboratory extraction data sheets for organic analyses. Copies are included for over 80 percent of the samples and represent SVOCs, OCPs, explosives, and TPH-gas and diesel analyses in both soil and water.

E.6 RECOMMENDATIONS

E.6.0.1. This section provides a summary of recommendations for the analytical portion of the TEAD - N Phase II RFI, Group A Suspected Releases SWMUs. All of the laboratory control limits should be reviewed, particularly isodrin in the OCP analysis and selenium in the metals analysis. Because these two analytes were consistently outside the acceptance limits, one of two things should be done. Either the limits should be adjusted to conform to the historical trends or the method procedures should be reviewed and revised.

E.6.0.2. Overall, the project goals were met for QC data and data quality objectives.

ATTACHMENT E-1

APPENDIX VIII REVIEW

HAZARDOUS WASTE MANAGEMENT GUIDE

APPENDIX VIII HAZARDOUS CONSTITUENTS

	Common name	Chemical abstracts name	Chemical abstract No.
AA	Acetonitrile SC-S	Same	75-05-8
	Acetophenone SC	Ethanone, 1-phenyl-	98-86-2
	2-Acetylaminefluarone SC	Acetamide, N-9H-fluoren-2-yl-	53-96-3
HYD	Acetyl chloride	Same	75-36-5
	1-Acetyl-2-thiourea SC	Acetamide, N-(aminothioxomethyl)-	591-08-2
A,OX	Acrolein P	2-Propenal	107-02-8
	Acrylamide SC	2-Propenamide	79-06-1
A	Acrylonitrile SC	2-Propenenitrile	107-13-1
	Aflatoxins SC - Natural Product	Same	1402-68-2
	Aldicarb P	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime	116-06-3
A	Aldrin	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10, 10-10-hexachloro-1,4,4a,5,8,8a-hexahydro-,(1alpha,4alpha,4abeta, 5alpha,8alpha,8abeta)-	309-00-2
OX	Allyl alcohol	2-Propen-1-ol	107-18-6
HYD	Allyl chloride	1-Propane, 3-chloro	107-18-6
AT	Aluminum phosphide P	Same	20859-73-8
	4-Aminobiphenyl SC	[1,1'-Biphenyl]-4-amine	92-67-1
	5-(Aminomethyl)-3-isoxazolol SC	3(2H)-Isoxazolone, 5-(aminomethyl)-	2763-96-4
	4-Aminopyridine SC	4-Pyridineamine	504-24-5
	Amitrole P	1H-1,2,4-Triazol-3-amine	61-82-5
AT	Ammonium vanadate	Vanadic acid, ammonium salt	7803-55-6
A-A	Aniline	Benzenamine	62-53-3
A	Antimony	Same	7440-36-0
AT	Antimony compounds, N.O.S.[1]		
	Aramite P	Sulfurous acid, 2-chloroethyl-, 2-[4-(1,1-dimethylethyl)phenoxy]-1-methylethyl ester	
A	Arsenic	Same	140-57-8
AT	Arsenic compounds, N.O.S.[1]		7440-38-2
	Arsenic acid	Arsenic acid H_3AsO_4	7778-39-4
	Arsenic pentoxide	Arsenic oxide As_2O_5	1303-28-2
AT	Arsenic trioxide	Arsenic oxide As_2O_3	1327-53-3
	Auramine SC-M ?	Benzamine 4,4'-carbonimidoylbis[N,N-dimethyl-	492-80-8
	Azaserine SC-M	L-Serine, diazoacetate (ester)	115-02-6
A	Barium	Same	7440-39-3
AT	Barium compounds, N.O.S.[1]		
AT	Barium cyanide	Same	542-62-1
A-A	Benz[c]acridine	Same	225-51-4
A	Benz[a]anthracene	Same	56-55-3
HYD	Benzalchloride	Benzene, (dichloromethyl)-	98-87-3
A	Benzene	Same	71-43-2

HAZARDOUS WASTE MANAGEMENT GUIDE

Appendix VIII, Continued

	Common name	Chemical abstracts name	Chemical abstract No.
A T	Benzenearsonic acid	Arsonic acid, phenyl-	98-05-5
A	Benzidine	[1,1'-Biphenyl]-4,4'-diamine	92-87-5
A	Benzo[b]fluoranthene	Benz(e)acephenanthryiene	205-99-2
A	Benzo[j]fluoranthene	Same	205-82-3
A	Benzo(k)fluoranthene	Same	207-08-9
A	Benzo[a]pyrene	Same	50-32-8
	p-Benzoquinone SC	2,5-Cyclohexadiene-1,4-dione	106-51-4
HYD	Benzotrichloride	Benzene, (trichloromethyl)-	98-07-7
HYD	Benzylchloride	Benzene, (chloromethyl)-	100-44-7
A	Beryllium	Same	7440-41-7
AT	Beryllium compounds, N.O.S.[1]		
HYD	Bromoacetone SC	2-Propanone, 1-bromo-	598-31-2
A	Bromoform	Methane, tribromo-	75-25-2
A	4-Bromophenylphenylether	Benzene, 1-bromo-4-phenoxy	101-55-3
	Brucine SC-M	Strychnidin-10-one, 2,3-dimethoxy	357-57-3
A	Butyl benzylphthalate	1,2-Benzenedicarboxylic acid, butyl phenylmethyl ester	85-68-7
AT	Cacodylic acid (Arsenic)	Arsenic acid, dimethyl-	75-60-5
A	Cadmium	Same	7440-43-9
AT	Cadmium compounds, N.O.S.[1]		
AT	Calcium chromate	Chromic acid H_2CrO_4, calcium salt	13765-19-0
AT	Calcium cyanide	Calcium cyanide $Ca(CN)_2$	592-01-8
	Carbon disulfide SC-S	Same	75-15-0
HYD	Carbon oxyfluoride	Carbonic difluoride	353-50-4
A	Carbon tetrachloride	Methane, tetrachloro-	56-23-5
	Chloral SC-M	Acetaldehyde, trichloro-	75-87-6
	Chlorambucil SC-M	Benzenebutanoic acid, 4-[bis(2-chloroethyl) amino-]	305-03-3
A	Chlordane	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-	57-74-9
A	Chlordane, (alpha and gamma isomers)		
A	Chlorinated benzenes, N.O.S.[1]		
A	Chlorinated ethane, N.O.S.[1]		
A-A	Chlorinated fluorocarbons, N.O.S.[1]		
A-A	Chlorinated naphthalene, N.O.S.[1]		
A-A	Chlorinated phenol, N.O.S.[1]		
	Chlornaphazin SC-M	Naphthalenamine, N,N-bis(2-chloroethyl)-	494-03-1
OX	Chloroacetaldehyde	Acetaldehyde, chloro-	107-20-0
A-A	Chloroalkyl ethers, N.O.S.[1]		
A	p-Chloroaniline	Benzenamine, 4-chloro-	106-47-8
A	Chlorobenzene	Benzene, chloro-	108-90-7
	Chlorobenzilate P	Benzeneacetic acid, 4-chloro-alpha-(4-chloro-phenyl)-alpha-hydroxy-, ethyl ester	510-15-6
A	p-Chloro-m-cresol	Phenol, 4-chloro-3-methyl-	59-50-7
A-A	2-Chloroethyl vinyl ether	Ethene, (2-chloroethoxy)-	110-75-8
A	Chloroform	Methane, trichloro-	67-66-3
A-A	Chloromethylmethyl ether	Methane, chloromethoxy-	107-30-2
A	beta-Chloronaphthalene ...	Napthalene, 2-chloro-	91-58-7
A	o-Chlorophenol	Phenol, 2-chloro-	95-57-8
	1-(o-Chlorophenyl) thiourea SC	Thiourea, (2-chlorophenyl)-	5344-82-1
	Chloroprene SC	1,3-butadiene 2-chloro-	126-99-8
	3-Chloropropionitrile SC	Propanenitrile, 3-chloro-	542-76-7
A	Chromium compounds, N.O.S.[1]		
A	Chrysene	Same	218-01-9
	Citrus red No. 2 SC-[illegible]	2-Naphthalenol, 1-[(2,5-dimethoxyphenyl) azo]-	6358-53-8
A-A	Coal tar creosote	Same	8007-45-2
AT	Copper cyanide	Copper cyanide CuCN	544-92-3
A-A	Creosote	Same	
A	Cresol (Cresylic acid)	Phenol, methyl-	1319-77-3
OX	Crotonaldehyde	2-Butenal	4170-30-3
A	Cyanides (soluble salts and complexes) N.O.S.[1]		
OX	Cyanogen	Ethanedinitrile	460-19-5

HAZARDOUS WASTE MANAGEMENT GUIDE

Appendix VIII. Continued

Common name	Chemical abstracts name	Chemical abstract No.
HYD Cyanogen bromide	Cyanogen bromide (CN)Br	506-68-3
HYD Cyanogen chloride	Cyanogen chloride (CN)Cl	506-77-4
Cycasin SC-M	beta-D-Glucopyranoside, (methyl-ONN-azoxy) methyl	14901-08-7
2-Cyclohexyl-4,6-dinitrophenol SC	Phenol, 2-cyclohexyl-4,6-dinitro-	131-89-5
Cyclophosphamide P	2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide	50-18-0
A 2,4-D	Acetic acid, (2,4-dichlorophenoxy)-	94-75-7
AT 2,4-D, salts, esters		
Daunomycin SC-M	5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-	
A DDD	Benzene, 1,1'-(2,2-dichloro-ethylidene)bis[4-chloro-	20830-81-3
A DDE	Benzene, 1,1'-(dichloroethenylindene)bis[4-chloro-	72-54-8
A DDT	Benezene, 1,1'-(2,2,2-tri-chloroethylidene)bis [4-chloro-	72-55-9
Diallate P	Carbamothioic acid, bis(1-methylethyl)-S-(2,3-dichloro-2-propenyl) ester	50-29-3
A-A Dibenz[a,h]acridine	Same	2303-16-4
A-A Dibenz[a,j]acridine	Same	226-36-8
A-A Dibenz[a,h]anthracene	Same	224-42-0
A-A 7H-Dibenzo[c,g]carbazole	Same	53-70-3
A Dibenzo[a,e]pyrene	Naphthol[1,2,3,4-def]chrysene	194-59-2
A-A Dibenzo[a,h]pyrene	Dibenzo[b,def]chrysene	192-65-4
A-A Dibenzo[a,i]pyrene	Benzo[rst]pentaphene	189-64-0
1,2-Dibromo-3-chloropropane P	Propane, 1,2-dibromo-3-chloro	189-55-9
A Dibutylphthalate	1,2-Benzenedicarboxylic acid, dibutyl ester	96-12-8
A o-Dichlorobenzene	Benzene, 1,2-dichloro-	84-74-2
A m-Dichlorobenzene	Benzene, 1,3-dichloro-	95-50-1
A p-Dichlorobenzene	Benzene, 1,4-dichloro-	541-73-1
AT Dichlorobenzene, N.O.S.[1]	Benzene, dichloro-	106-46-7
A 3,3'-Dichlorobenzidine	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-	25321-22-6
1,4-Dichloro-2-butene SC	2-Butene, 1,4-dichloro-	91-94-1
A Dichlorodifluoromethane	Methane, dichlorodifluoro-	764-41-0
A Dichloroethylene, N.O.S.[1]	Dichloroethylene	75-71-8
A 1,1-Dichloroethylene	Ethene, 1,1-dichloro-	25323-30-2
A 1,2-Dichloroethylene	Ethene, 1,2-dichlrol- (E)-	75-35-4
A-A Dichloroethyl ether	Ethane, 1,1'oxybis[2-chloro-	156-60-5
A-A Dichloroisopropyl ether	Propane, 2,2'-oxybis[2-chloro-	111-44-4
A-A Dichloromethoxy ethane	Ethane, 1,1'-[methylenebis(oxy)]bis [2-chloro-	108-60-1
A-A Dichloromethyl ether	Methane, oxybis[chloro-	111-91-1
A 2,4-Dichlorophenol	Phenol, 2,4-dichloro-	542-88-1
A-A 2,6-Dichlorophenol	Phenol, 2,6-dichloro-	120-83-2
AT Dichlorophenylarsine	Arsonous dichloride, phenyl-	87-65-0
A Dichloropropane, N.O.S.[1]	Propane, dichloro-	696-28-6
Dichloropropanol, N.O.S.[1] SC	Propanol, dichloro-	26638-19-7
HYD Dichloropropene, N.O.S.[1]	1-Propene, dichloro-	26545-73-3
HYD 1,3-Dichloropropene	1-Propene, 1,3-dichloro-	26952-23-8
A Dieldrin	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-,(1aalpha,2beta,2aalpha,3beta, 6beta,6aalpha,7beta,7aalpha)-	542-75-6
HYD 1,2:3,4-diepoxybutane	2,2'-Bioxirane	60-57-1
A Diethylarsine	Arsine, diethyl-	1464-53-5
1,4 Diethyleneoxide SC	1,4 Dioxane	692-42-2
A Diethylhexyl phthalate	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	123-91-1
N,N'-Diethylhydrazine	Hydrazine, 1,2-diethyl-	117-81-7
O,O-Diethyl S-methyldithiophosphate P	Phosphorodithioic acid, O,O-diethyl S-methyl ester	1615-80-1
		3288-58-2

Appendix VIII. Continued

	Common name	Chemical abstracts name	Chemical abstract No.
	Diethyl-p-nitrophenyl phosphate SC - P ?	Phosphoric acid, diethyl-4-nitrophenyl ester	311-45-5
A	Diethylphthalate	1,2-Benzenedicarboxylic acid, diethyl ester	84-66-2
	O,O-Diethyl O-pyrazinyl phosphorothioate P	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	297-97-2
	Diethylstilbesterol SC - M	Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)-	56-53-1
	Dihydrosafrole SC - M, ?	1,3 Benzodioxole, 5-propyl-	94-58-6
D	Diisopropylfluorophosphate(DFP) SC-1	Phosphorofluoridic acid, bis(1-methylethyl) ester	55-91-4
	Dimethoate P	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester	60-51-5
A-A	3,3'-Dimethoxybenzidine	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-	119-90-4
	p-Dimethylaminoazobenzene SC - dye ?	Benzenamine, N,N-dimethyl-4-(phenylazo)-	60-11-7
A-A	7,12-Dimethylbenz[a]anthracene	Benz[a]anthracene, 7,12-dimethyl	57-97-6
A-A	3,3'-Dimethylbenzidine	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-	119-93-7
HYD	Dimethylcarbamoyl chloride	Carbamic chloride, dimethyl-	79-44-7
O X	1,1-Dimethylhydrazine	Hydrazine, 1,1-dimethyl-	57-14-7
O X	1,2-Dimethylhydrazine	Hydrazine, 1,2-dimethyl-	540-73-8
	alpha, alpha-Dimethylphenethylamine SC	Benzeneethanamine, alpha,alpha-dimethyl-	122-09-8
A	2,4-Dimethylphenol	Phenol, 2,4-dimethyl-	105-67-9
A	Dimethylphthalate	1,2-Benzenedicarboxylic acid, dimethyl ester	131-11-3
HYD	Dimethyl sulfate	Sulfuric acid, dimethyl ester	77-78-1
A-A	Dinitrobenzene, N.O.S.[1]	Benzene, dinitro-	25154-54-5
A	4,6-Dinitro-o-cresol	Phenol, 2-methyl-4,6-dinitro-	534-52-1
A-A	4,6-Dinitro-o-cresol salts		
A	2,4-Dinitrophenol	Phenol, 2,4-dinitro-	51-28-5
A	2,4-Dinitrotoluene	Benzene, 1-methyl-2,4-dinitro-	121-14-2
A	2,6-Dinitro toluene	Benzene, 2-methyl-1,3-dinitro-	606-20-2
	Dinoseb P	Phenol, 2-(1-methylpropyl)-4,6-dinitro-	88-85-7
A	Di-n-octyl phthalate	1,2-Benzenedicarboxylic acid, dioctyl ester	117-84-0
	Diphenylamine SC	Benzenamine, N-phenyl-	122-39-4
O X	1,2-Diphenylhydrazine	Hydrazine, 1,2-diphenyl-	122-66-7
A	Di-n-propylnitrosamine	1-Propanamine, N-nitroso-N-propyl-	621-64-7
	Disulfoton P	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester	298-04-4
	Dithiobiuret SC	Thioimidodicarbonic diamide [(H2N)C(S)]2NH	541-53-7
A	Endosulfan	6,9-Methano-2,4,3-benzodioxathiepen, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-,3-oxide	115-29-7
	Endothall P	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid	145-73-3
A	Endrin	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2abeta,3alpha,6alpha,6abeta,7beta,7aalpha)-	72-20-8
A	Endrin metabolites		
HYD	Epichlorohydrin	Oxirane, (chloromethyl)-	106-89-8
	Epinephrine SC - M	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)-	51-43-4
HYD	Ethyl carbamate (urethane)	Carbamic acid, ethyl ester	51-79-6
	Ethyl cyanide SC	Propanenitrile	107-12-0
	Ethylenebisdithiocarbamic acid SC - O	Carbamodithioic acid, 1,2-ethanediylbis-	111-54-6
	Ethylenebisdithiocarbamic acid, salts and esters. SC - O ?		
A-A	Ethlylene dibromide P	Ethane, 1,2-dibromo-	106-93-4
A	Ethylene dichloride	Ethane, 1,2-dichloro-	107-06-2
	Ethylene glycol monoethyl ether SC - I	Ethanol, 2-ethoxy-	110-80-5

HAZARDOUS WASTE MANAGEMENT GUIDE

Appendix VIII. Continued

	Common name	Chemical abstracts name	Chemical abstract No.
HVD	Ethyleneimine	Aziridine	151-56-4
HVD	Ethylene oxide	Oxirane	75-21-8
	Ethylenethiourea SC, P	2-Imidazolidinethione	96-45-7
A	Ethylidene dichloride	Ethane, 1,1-dichloro-	75-34-3
OX	Ethyl methacrylate	2-Propenoic acid, 2-methyl-, ethyl ester	97-63-2
HVD	Ethyl methanesulfonate	Methanesulfonic acid, ethyl ester	62-50-0
	Famphur P	Phosphorothioic acid, O-[4-[(dimethylamino) solfonyl] phenyl] O,O-dimethyl ester	52-85-7
A	Fluoranthene	Same	206-44-0
OX	Fluorine	Same	7782-41-4
	Fluoracetamide SC	Acetamide, 2-fluoro-	640-19-7
	Fluoroacetic acid, sodium salt SC	Acetic acid, fluoro-, sodium salt	62-74-8
OX	Formaldehyde	Same	50-00-0
	Formic acid	Same	64-18-6
OX	Glycidylaldehyde	Oxiranecarboxyaldehyde	765-34-4
A-A	Halomethanes, N.O.S.[1]		
A	Heptachlor	4,7-Methano-1H-indene,1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-	76-44-8
A	Heptachlor epoxide	2,5-Methano-2H-ideno[1,2-b]oxirene, 2,3,4,5,6,7,7-heptachloro-1a,1b,5,5a,6,6a-hexahydro- (1aalpha,1bbeta, 2alpha, 5alpha,5abeta,6beta,6aalpha)-	1024-57-3
A	~~Heptachlor epoxide (alpha, beta, and gamma isomers)~~ Hexachlorocyclohexane		
D	Heptachlorodibenzofurans		
D	Heptachlorodibenzo-p-dioxins		
A	Hexachlorobenzene	Benzene, hexachloro-	118-74-1
A	Hexachlorobutadiene	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	87-68-3
A	Hexachlorocyclopentadiene	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	77-47-4
D	Hexachlorodibenzo-p-dioxins		
D	Hexachlorodibenzofurans		
A	Hexachloroethane	Ethane, hexachloro-	67-72-1
	Hexachlorophene SC	Phenol, 2,2'-methylenebis[3,4,6-trichloro-	70-30-4
	Hexachloropropene SC	1-Propene, 1,1,2,3,3,3-hexachloro-	1888-71-7
	Hexaethyl tetraphosphate SC	Tetraphosphoric acid, hexaethyl ester	757-58-4
OX	Hydrazine	Same	302-01-2
AT	Hydrogen cyanide	Hydrocyanic acid	74-90-8
HVD	Hydrogen fluoride	Hydrofluoric acid	7664-39-3
OX	Hydrogen sulfide	Hydrogen sulfide H_2S	7783-06-4
A	Indeno[1,2,3cd]pyrene	Same	193-39-5
OX	Isobutyl alcohol	1-Propanol, 2-methyl-	76-83-1
A	Isodrin	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10, 10-hexachloro-1,4,4a,5,8,8a-hexahydro-(1alpha,4alpha,4abeta,5beta,8beta, 8abeta-	465-73-6
	Isosafrole SC	1,3-Benzodioxole,5-(1-propenyl)-	120-58-1
	Kepone P	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachloro-octahydro-	143-50-0
	Lasiocarpine SC-M	2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy]methyl] -2-3-5-7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z), 7(2s*,3R*),7aalpha-	303-34-4
A	Lead	Same	7439-92-1
AT	Lead compounds, N.O.S.[1]		
	Lead acetate	Acetic acid, lead (2) salt	301-04-2
	Lead phosphate	Phosphoric acid, lead (2) salt (2:3)	7446-27-7
AT	Lead subacetate	Lead, bis(acetato-O)tetrahydroxytri-	1335-32-6
A	Lindane	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha,2alpha,3beta,4alpha,5alpha, 6beta)-	58-89-9
	Maleic anhydride SC	2,5-Furandione	108-31-6
	Maleic hydrazide SC	3,6-Pyridazinedione, 1,2-dihydro-	123-33-1

Appendix VIII — Continued

Common name	Chemical abstracts name	Chemical abstract No.
Malononitrile	Propanedinitrile	109-77-3
Melphalan	L-Phenylalanine, 4-[bis(2-chloroethyl) amino]-	148-82-3
A Mercury	Same	7439-97-6
AT Mercury compounds, N.O.S.[1]		
AT Mercury fulminate	Fulminic acid, mercury (2+) salt	628-86-4
Methacrylonitrile	2-Propanenitrile, 2-methyl-	126-98-7
Methapyrilene	1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-	91-80-5
Methomyl	Ethanimidothioic acid, N-[[(methylamino) carbonyl]oxy]-, methyl ester	16752-77-5
A Methoxychlor	Benzene, 1,1'-(2,2,2-trichloroethylidene) bis[4-methoxy-	72-43-5
HYD Methyl bromide	Methane, bromo-	74-83-9
HYD Methyl chloride	Methane, chloro-	74-87-3
HYD Methylchlorocarbonate	Carbonchloridic acid, methyl ester	79-22-1
A Methyl chloroform	Ethane, 1,1,1-trichloro-	71-55-6
A-A 3-Methylcholanthrene	Benz[j]aceanthryiene, 1,2-dihydro-3-methyl-	56-49-5
4,4'-Methylene-bis(2-chloroaniline)	Benzenamine, 4,4'-methylenebis[2-chloro-	101-14-4
A-A Methylene bromide	Methane, dibromo-	74-95-3
A Methylene chloride	Methane, dichloro-	75-09-2
A Methyl ethyl ketone (MEK)	2-Butanone	78-93-3
Methyl ethyl ketone peroxide (Unstable)	2-Butanone, peroxide	1338-23-4
OX Methyl hydrazine	Hydrazine, methyl-	60-34-4
HYD Methyl iodide	Methane, iodo-	74-88-4
HYD Methyl isocyanate	Methane, isocyanato-	624-83-9
2-Methyllactonitrile	Propanenitrile, 2-hydroxy-2-methyl-	75-86-5
OX Methyl methacrylate	2-Propenoic acid, 2-methyl-, methyl ester	80-62-6
Methyl methanesulfonate	Methanesulfonic acid, methyl ester	66-27-3
Methyl parathion	Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester	298-00-0
Methylthiouracil	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-	56-04-2
Mitomycin C	Azirino[2',3':3,4]pyrrolo[1,2-a]indole-4,7-dione, 6-amino-8-[[(aminocarbonyl)oxy] methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-[1aS-(1aalpha,8beta, 8aalpha,8balpha)]-	50-07-7
D MNNG (Explosive)	Guanidine, N-methyl-N'-nitro-N-nitroso-	70-25-7
HYD Mustard gas	Ethane,1,1'-thiobis[2-chloro-	505-60-2
A Naphthalene	Same	91-20-3
1,4,-Naphthoquinone	1,4-Naphthalenedione	130-15-4
alpha-Naphthylamine	1-Naphthalenamine	134-32-7
beta-Naphthylamine	2-Naphthalenamine	91-59-8
alpha-Naphthylthiourea	Thiourea, 1-naphthalenyl-	86-88-4
A Nickel	Same	7440-02-0
AT Nickel compounds, N.O.S.[1]		
I Nickel carbonyl	Nickel carbonyl Ni(CO)$_4$, (T-4)-	13463-39-3
AT Nickel cyanide	Nickel cyanide Ni(CN)$_2$	557-19-7
Nicotine	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-	54-11-5
Nicotine salts		
GAS Nitric oxide	Nitrogen oxide NO	10102-43-9
A p-Nitroaniline	Benzenamine, 4-nitro-	100-01-6
A Nitro-benzene	Benzene, nitro-	98-95-3
GAS Nitrogen dioxide	Nitrogen oxide NO$_2$	10102-44-0
HYD Nitrogen mustard	Ethanamine, 2-chloro-, N-(2-chloroethyl)-N-methyl-	51-75-2
HYD Nitrogen mustard, hydrochloride salt		
Nitrogen mustard N-oxide	Ethanamine, 2-chloro-N-(2-chloroethyl)-N-methyl-, N-oxide	126-85-2
Nitrogen mustard, N-oxide, hydrochloride salt		
D Nitroglycerin (Explosive)	1,2,3-Propanetriol, trinitrate	55-63-0
A p-Nitrophenol	Phenol, 4-nitro-	100-02-7

Appendix VIII — Continued

Common name	Chemical abstracts name	Chemical abstract No.
2-Nitropropane	Propane, 2-nitro-	79-46-9
Nitrosamine, N.O.S.[1]		
N-Nitrosodi-n-butylamine	1-Butanamine, N-butyl-N-nitroso-	924-16-3
N-Nitrosodiethanolamine	Ethanol, 2,2'-(nitrosoimino)bis-	1116-54-7
N-Nitrosodi ethylamine	Ethanamine, N-ethyl-N-nitroso-	55-18-5
A N-Nitrosodimethylamine	Methamine, N-methyl-N-nitroso-	62-75-9
N-Nitroso-N-ethylurea	Urea, N-ethyl-N-nitroso-	759-73-9
N-Nitrosomethylethylamine	Ethanamine, N-methyl-N-nitroso-	10595-95-6
N-Nitroso-N-methylurea	Urea, N-methyl-N-nitroso-	684-93-5
N-Nitroso-N-methylurethane	Carbamic acid, methylnitroso-, ethyl ester	615-53-2
N-Nitrosomethylvinylamine	Vinylamine, N-methyl-N-nitroso-	4549-40-0
N-Nitrosomorpholine	Morpholine, 4-nitroso-	59-89-2
N-Nitrosonornicotine	Pyridine, 3-(1-nitroso-2-pyrrolidinyl)-, (S)-	16543-55-8
N-Nitrosopiperidine	Piperidine, 1-nitroso-	100-75-4
N-Nitrosopyrrolidine	Pyrrolidine, 1-nitroso-	930-55-2
N-Nitrososarcosine	Glycine, N-methyl-N-nitroso-	13256-22-9
5-Nitro-o-toluidine	Benzenamine, 2-methyl-5-nitro-	99-55-8
Octamethylpyrophosphoramide	Diphosphoramide, octamethyl	152-16-9
Osmium tetroxide	Osmium oxide OsO_4, (T-4)-	20816-12-0
OX Paraldehyde	1,3,5-Trioxane, 2,4,6-trimethyl-	123-63-7
Parathion	Phosphorothioic acid, O,O-diethyl O-(4-nitro-phenyl) ester	56-38-2
A-A Pentachlorobenzene	Benzene, pentachloro-	608-93-5
D Pentachloro-dibenzo-p-dioxins		
D Pentachloro-dibenzofurans		
A-A Pentachloroethane	Ethane, pentachloro-	76-01-7
Pentachloronitrobenzene (PCNB)	Benzene, pentachloronitro	82-68-8
Pentachlorophenol	Phenol, pentachloro-	87-86-5
Phenacetin	Acetamide, N-(4-ethoxyphenyl)-	62-44-2
A Phenol	Same	108-95-2
Phenylenediamine	Benzenediamine	25265-76-3
T Phenylmercury acetate	Mercury, (acetato-O) phenyl-	62-38-4
Phenylthiourea	Thiourea, phenyl-	103-85-5
HYD Phosgene	Carbonic dichloride	75-44-5
OX Phosphine	Same	7803-51-2
Phorate	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester	298-02-2
A-A Phthalic acid esters N.O.S.[1]		
HYD Phthalic anhydride	1,3-Isobenzofurandione	85-44-9
2-Picoline	Pyridine, 2-methyl-	109-06-8
A Polychlorinated biphenyls N.O.S.[1]		
AT Potassium cyanide	Potassium cyanide K(CN)	151-50-8
AT Potassium silver cyanide	Argentate(1-), bis(cyano-C)-, potassium	506-61-6
Pronamide	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	23950-58-5
1,3-Propane sultone	1,2-Oxathiolane, 2,2-dioxide	1120-71-4
OX n-Propylamine	1-Propanamine	107-10-8
OX Propargyl alcohol	2-Propyn-1-ol	107-19-7
A-A Propylene dichloride	Propane, 1,2-dichloro-	78-87-5
HYD 1,2-Propylenimine	Aziridine, 2-methyl-	75-55-8
Propylthiouracil	4(1H)-Pyrimidinone, 2,3-dihydro-6-propyl-2-thioxo-	51-52-5
Pyridine	Same	110-86-1
Reserpinie	Yohimban-16-carbonxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl) oxy]-, methyl ester, (3beta,16beta,17alpha, 18beta,20alpha)-	50-55-5
Resorcinol	1,3-Benzenediol	108-46-3
Saccharin	1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide	81-07-2
Saccharin salts		
Safrole	1,3-Benzodioxole, 5-(2-propenyl)-	94-59-7
Selenium	Same	7782-49-2
Selenium compounds, N.O.S.[1]		
Selenium dioxide	Selenious acid	7783-00-8
AT Selenium sulfide	Selenium sulfide SeS_2	7488-56-4

Appendix VIII. Continued

	Common name	Chemical abstracts name	Chemical abstract No.
	Selenourea ..... SC	Same	630-10-4
A	Silver	Same	7440-22-4
AT	Silver compounds, N.O.S.[1]		
AT	Silver cyanide	Silver cyanide Ag(CN)	506-64-9
A	Silvex (2,4,5-TP)	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-	93-72-1
AT	Sodium cyanide	Sodium cyanide Na(CN)	143-33-9
	Streptozotocin ..... SC - M	D-Glucose, 2-deoxy-2-[[(methylnitrosoamino)carbonyl]amino]-	18883-66-4
	Strychnine ..... P	Strychnidin-10-one	57-24-9
	Strychnine salts ..... P		
DA	TCDD	Dibenzo[b,e][1,4]dioxin,2,3,7,8-tetrachloro-	1746-01-6
A-A	1,2,4,5-Tetrachlorobenzene	Benzene, 1,2,4,5-tetrachloro-	95-94-3
D	Tetrachlorodibenzo-p-dioxins Combust		
D	Tetrachlorodibenzofurans ..... Combust		
A	Tetrachloroethane, N.O.S.[1]	Ethane, tetrachloro-, N.O.S.	25322-20-7
A-A	1,1,1,2-Tetrachloroethane	Ethane, 1,1,1,2-tetrachloro-	630-20-6
A	1,1,2,2-Tetrachloroethane	Ethane, 1,1,2,2-tetrachloro-	79-34-5
A	Tetrachloroethylene	Ethene, tetrachloro-	127-18-4
A-A	2,3,4,6-Tetrachlorophenol	Phenol, 2,3,4,6-tetrachloro-	58-90-2
	Tetraethyldithiopyrophosphate ..... SC	Thiodiphosphoric acid, tetraethyl ester	3689-24-5
AT	Tetraethyl lead	Plumbane, tetraethyl-	78-00-2
	Tetraethyl pyrophosphate ..... SC	Diphosphoric acid, tetraethyl ester	107-49-3
	Tetranitromethane ..... SC	Methane, tetranitro-	509-14-8
A	Thallium	Same	7440-28-0
AT	Thallium compounds, N.O.S.[1]		
	Thallic oxide	Thallium oxide Tl_2O_3	1314-32-5
	Thallium (I) acetate	Acetic acid, thallium (1+) salt	563-68-8
	Thallium (I) carbonate	Carbonic acid, dithallium (1+) salt	6533-73-9
	Thallium (I) chloride	Thallium chloride TlCl	7791-12-0
	Thallium (I) nitrate	Nitric acid, thallium (1+) salt	10102-45-1
	Thallium selenite	Selenious acid, dithallium (1+) salt	12039-52-0
AT	Thallium (I) sulfate	Sulfuric acid, dithallium (1+) salt	7446-18-6
	Thioacetamide ..... SC	Ethanethioamide	62-55-5
	Thiofanox ..... P	2-Butanone, 3,3-dimethyl-1-(methylthio)-, O-[(methylamino)carbonyl]oxime	39196-18-4
6X	Thiomethanol	Methanethiol	74-93-1
6X	Thiophenol	Benzenethiol	108-98-5
	Thiosemicarbazide ..... SC	Hydrazinecarbothioamide	79-19-6
	Thiourea ..... SC P	Same	62-56-6
	Thiram	Thioperoxydicarbonic diamide, $[(H_2N)C(S)]_2S_2$, tetramethyl-	137-26-8
A	Toluene	Benzene, methyl-	108-88-3
6X	Toluenediamine ..... SC	Benzenediamine, ar-methyl-	25376-45-8
	Toluene-2,4-diamine ..... SC	1,3-Benzenediamine, 4-methyl-	95-80-7
	Toluene-2,6-diamine ..... SC	1,3-Benzenediamine, 2-methyl-	823-40-5
	Toluene-3,4-diamine ..... SC	1,2-Benzenediamine, 4-methyl-	496-72-0
HYD	Toluene diisocyanate	Benzene, 1,3-diisocyanato-methyl-	26471-62-5
	o-Toluidine ..... SC	Benzenamine, 2-methyl-	95-53-4
	o-Toluidine hydrochloride ..... SC	Benzenamine, 2-methyl-, hydrochloride	636-21-5
	p-Toluidine ..... SC	Benzenamine, 4-methyl-	106-49-0
A	Toxaphene	Same	8001-35-2
A	1,2,4-Trichlorobenzene	Benzene, 1,2,4-trichloro	120-82-1
A	1,1,2-Trichloroethane	Ethane, 1,1,2-trichloro	79-00-5
A	Trichloroethylene	Ethene, trichloro	79-01-6
	Trichloromethanethiol	Methanethiol, trichloro-	75-70-7
A	Trichloromonofluoromethane	Methane, trichlorofluoro-	75-69-4
A	2,4,5-Trichlorophenol	Phenol, 2,4,5-trichloro-	95-95-4
A	2,4,6-Trichlorophenol	Phenol, 2,4,6-trichloro-	88-06-2
	2,4,5-T	Acetic acid, (2,4,5-trichlorophenoxy)-	93-76-5
-A	Trichloropropane, N.O.S.[1]		25735-29-9
-A	1,2,3-Trichloropropane	Propane, 1,2,3-trichloro-	96-18-4
	O,O,O-Triethyl phosphorothioate ..... P	Phosphorothioic acid, O,O,O-triethyl ester	126-68-1
A	1,3,5-Trinitrobenzene	Benzene, 1,3,5-trinitro	99-35-4
	Tris(1-aziridinyl) phosphine sulfide ..... P	Aziridine, 1,1',1"-phosphinothioylidynetris-	52-24-4
	Tris(2,3-dibromopropyl) phosphate ..... P	1-Propanol, 2, 3-dibromo-, phosphate (3:1)	126-72-7

Appendix VIII. Continued

	Common name	Chemical abstracts name	Chemical abstract No.
	Trypan blue ..... SC - dye	2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'-dimethyl [1,1'-biphenyl]-4,4'-diyl)bis(azo)] bis[5-amino-4-hydroxy-, tetrasodium salt	72-57-1
	Uracil mustard ..... SC - M	2,4(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-	66-75-1
AT	Vanadium pentoxide	Vanadium oxide V_2O_5	1314-62-1
A	Vinyl chloride	Ethene, chloro-	75-01-4
	Warfarin ..... SC - P	2 H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)- when present at concentration less than 0.3%	81-81-2
	Warfarin ..... SC - P	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, when present at concentrations greater than 0.3%	81-81-2
	Warfarin salts, when present at concentrations less than 0.3% ... SC - P	.....	.....
	Warfarin salts, when present at concentrations greater than 0.3% SC - P	.....	.....
AT	Zinc cyanide	.....	557-21-1
AT	Zinc phosphide	Zinc phosphide P_2Zn_3 when present at concentrations greater than 10%	1314-84-7
AT	Zinc phosphide	Zinc phosphide Zn_3P_2, when present at concentrations of 10% or less	1314-84-7

[1] The abbreviation N.O.S. (not otherwise specified) signifies those members of the general class not specifically listed by name in this appendix.

ATTACHMENT E-2

APPENDIX IX REVIEW

Ground-Water Monitoring List

	Common name	CAS RN	Chemical abstracts service index name	Suggested methods	PQL (µg/L)
A, NM	Acenaphthene	83-32-9	Acenaphthylene, 1,2-dihydro-	8100	200
				8270	10
A, NM	Acenaphthylene	208-96-8	Acenaphthylene	8100	200
				8270	10
A	Acetone	67-64-1	2-Propanone	8240	100
SC, AA	Acetophenone	98-86-2	Ethanone, 1-phenyl-	8270	10
SC-S, AA	Acetonitrile; Methylcyanide	75-05-8	Acetonitrile	8015	100
SC	2-Acetylamino-fluorene; 2-AAF	53-96-3	Acetamide, N-9H-fluoren-2-yl-	8270	10
A, CX, P	Acrolein	107-02-8	2-Propenal	8030	5
				8240	5
A, SC	Acrylonitrile	107-13-1	2-Propenenitrile	8030	5
				8240	5
P, NM	Aldrin	309-00-2	1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-(1α,4α,4aß,5α,8α,8aß)-	8080	0.05
				8270	10
HYD	Allyl chloride	107-05-1	1-Propene, 3-chloro-	8010	5
				8240	100
SC	4-Aminobiphenyl	92-67-1	[1,1'-Biphenyl]-4-amine	8270	10
SC, AA	Aniline	62-53-3	Benzenamine	8270	10
A, NM	Anthracene	120-12-7	Anthracene	8100	200
				8270	10
A	Antimony	(Total)	Antimony	6010	300
				7040	2,000
				7041	30
P	Aramite	140-57-8	Sulfurous acid, 2-chloroethyl 2-[4-(1,1-dimethylethyl)phenoxy] -1-methylethylester	8270	10
A	Arsenic	(Total)	Arsenic	6010	500
				7060	10
				7061	20

A	Barium	(Total)	Barium	6010 7080	20 1,000
A	Benzene	71-43-2	Benzene	8020 8240	2 5
A, N.M	Benzo[a]anthracene; Benzanthracene	56-55-3	Benz [a]anthracene	8100 8270	200 10
A, N.M	Benzo[b]fluoranthene	205-99-2	Benz[e]acephenanthrylene	8100 8270	200 10
A, N.M	Benzo[k]fluoranthene	207-08-9	Benzo[k]fluoranthene	8100 8270	200 10
A, NM	Benzo[ghi]perylene	191-24-2	Benzo[ghi]perylene	8100 8270	200 10
A, N.M	Benzo[a]pyrene	50-32-8	Benzo[a]pyrene	8100 8270	200 10
CX	Benzyl alcohol	100-51-6	Benzenemethanol	8270	20
A	Beryllium	(Total)	Beryllium	6010 7090 7091	3 50 2
A	alpha-BHC	319-84-6	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1α,2α,3ß,4α,5ß ,6ß)-	8080 8250	0.05 10
A	beta-BHC	319-85-7	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1α,2ß,3α,4ß,5α,6ß)-	8080 8250	0.05 40
A	delta-BHC	319-86-8	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1α,2α,3α;,4ß,5α,6ß)-	8080 8250	0.1 30
A	gamma-BHC; Lindane	58-89-9	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1a,2a,3b,4a,5a ,6b)-	8080 8250	0. 10
A A, SC	Bis(2-chloroethoxy) methane	111-91-1	Ethane, 1,1'-[methylenebis (oxy)]bis[2-chloro-	8270	10
A, SC	Bis(2-chloroethyl) ether	111-44-4	Ethane, 1,1'-oxybis [2-chloro-	8270	10
A, SC	Bis(2-chloro-1-methylethyl)ether; 2,2'-Di-chloro-diisopropyl ether	108-60-1	Propane, 2,2'-oxybis [1-chloro-	8010 8270	10 10
A, N.M	Bis(2-ethylhexyl) phthalate	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl)ester	8060 8270	20 10
A	Bromodichloromethane	75-27-4	Methane, bromodichloro-	8010 8240	1 5
A	Bromoform; Tribromomethane	75-25-2	Methane, tribromo-	8010 8240	2 5

A	4-Bromophenyl phenyl ether	101-55-3	Benzene, 1-bromo-4-phenoxy-	8270	10
NM, A	Butyl benzyl phthalate; Benzyl butylphthalate	85-68-7	1,2-Benzenedicarboxylic acid, butyl phenylmethyl ester	8060 8270	5 10
A	Cadmium	(Total)	Cadmium	6010 7130 7131	40 50 1
AA, SC-5	Carbon disulfide	75-15-0	Carbon disulfide	8240	5
A	Carbon tetrachloride	56-23-5	Methane, tetrachloro-.	8010 8240	1 5
A, F	Chlordane	57-74-9	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2, 3,3a,4,7,7a-hexahydro-	8080 8250	0.1 10
SC, AA	p-Chloroaniline	106-47-8	Benzenamine, 4-chloro-	8270	20
A	Chlorobenzene	108-90-7	Benzene, chloro-	8010 8020 8240	2 2 5
P	Chlorobenzilate	510-15-6	Benzeneacetic acid, 4-chloro-α-(4-chlorophenyl) -α-hydroxy-, ethyl ester	8270	10
A	p-Chloro-m-cresol	59-50-7	Phenol, 4-chloro-3-methyl-	8040 8270	5 20
A	Chloroethane; Ethyl chloride	75-00-3	Ethane, chloro-	8010 8240	5 10
A	Chloroform	67-66-3	Methane, trichloro-	8010 8240	0.5 5
A	2-Chloronaphthalene	91-58-7	Naphthalene, 2-chloro-	8120 8270	10 10
A	2-Chlorophenol	95-57-8	Phenol, 2-chloro-	8040 8270	5 10
A	4-Chlorophenyl phenylether	7005-72-3	Benzene, 1-chloro-4-phenoxy-	8270	10
SC	Chloroprene	126-99-8	1,3-Butadiene, 2-chloro-	8010 8240	50 5
A	Chromium	(Total)	Chromium	6010 7190 7191	70 500 10
A, NM	Chrysene	218-01-9	Chrysene	8100 8270	200 10
A	Cobalt	(Total)	Cobalt	6010 7200 7201	70 500 10

A	Copper	(Total)	Copper	6010 7210	60 200
AA	m-Cresol	108-39-4	Phenol, 3-methyl-	8270	10
AA	o-Cresol	95-48-7	Phenol, 2-methyl-	8270	10
AA	p-Cresol	106-44-5	Phenol, 4-methyl-.	8270	10
A	Cyanide	57-12-5	Cyanide	9010	40
A, P	2,4-D; 2,4-Dichlorophenoxyacetic acid	94-75-7	Acetic acid, (2,4-dichlorophenoxy)-	8150	10
A, N,M	4,4'-DDD	72-54-8	Benzene 1,1'-(2,2-dichloroethylidene) bis[4-chloro-	8080 8270	0.1 10
A, N,M	4,4'-DDE	72-55-9	Benzene, 1,1'-(dichloroethenylidene) bis[4-chloro-	8080 8270	0.05 10
A, N,M	4,4'-DDT	50-29-3	Benzene, 1,1'-(2,2,2-trichloroethylidene) bis[4-chloro-	8080 8270	0.1 10
P	Diallate	2303-16-4	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester	8270	10
A-A, N,M	Dibenz[a,h]anthracene	53-70-3	Dibenz[a,h]anthracene.	8100 8270	200 10
AA	Dibenzofuran	132-64-9	Dibenzofuran	8270	10
A	Dibromochloromethane; Chlorodibromomethane	124-48-1	Methane, dibromochloro-	8010 8240	1 5
AA	1,2-Dibromo-3-chloropropane; DBCP	96-12-8	Propane, 1,2-dibromo-3-chloro-	8010 8240 8270	100 5 10
AA	1,2- Dibromoethane; Ethylene dibromide	106-93-4	Ethane, 1,2-dibromo-	8010 8240	10 5
A, N,M	Di-n-butyl phthalate	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester	8060 8270	5 10
A	o-Dichlorobenzene	95-50-1	Benzene, 1,2-dichloro-	8010 8020 8120 8270	2 5 10 10
A	m-Dichlorobenzene	541-73-1	Benzene, 1,3-dichloro-	8010 8020 8120 8270	5 5 10 10

A	p-Dichlorobenzene	106-46-7	Benzene, 1,4-dichloro-	8010 8020 8120 8270	2 5 15 10
A	3,3'-Dichlorobenzidine	91-94-1	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-	8270	20
A A, HYD.	trans-1,4-Dichloro-2-butene	110-57-	2-Butene, 1,4-dichloro-, (E)-	8240	5
A	Dichlorodifluoromethane	75-71-8	Methane, dichlorodifluoro-	8010 8240	10 5
A	1,1-Dichloroethane	75-34-3	Ethane, 1,1-dichloro-	8010 8240	1 5
A	1,2-Dichloroethane; Ethylene dichloride	107-06-2	Ethane, 1,2-dichloro-	8010 8240	0.5 5
A	1,1-Dichloroethylene; Vinylidene chloride	75-35-4	Ethene, 1,1-dichloro-	8010 8240	1 5
A	trans-1,2-Dichloroethylene	156-60-5	Ethene, 1,2-dichloro-, (E)-	8010 8240	1 5
A	2,4-Dichlorophenol	120-83-2	Phenol, 2,4-dichloro-	8040 8270	5 10
A A	2,6-Dichlorophenol	87-65-0	Phenol, 2,6-dichloro-	8270	10
A	1,2-Dichloropropane	78-87-5	Propane, 1,2-dichloro-	8010 8240	0.5 5
P, A, HYD	cis-1,3-Dichloropropene	10061-01-5	1-Propene, 1,3-dichloro-, (Z)-	8010 8240	20 5
P, A, HYD	trans-1,3-Dichloropropene	10061-02-6	1-Propene, 1,3-dichloro-, (E)-	8010 8240	5 5
NM, A, P	Dieldrin	60-57-1	2,7:3,6-Dimethanonaphth [2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aα,2ß,2aα,3ß,6ß,6aα,7b,7aα)-	8080 8270	0.05 10
A, NM	Diethyl phthalate	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester	8060 8270	5 10
HYD, P	O,O-Diethyl O-2-pyrazinyl phosphorothioate; Thionazin	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	8270	10

P	Dimethoate	60-51-5	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester	8270	10
SC	p-(Dimethylamimo) azobenzene	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-	8270	10
AA NM	7,12-Dimethylbenz[a]anthracene	57-97-6	Benz [a]anthracene, 7,12-dimethyl-.	8270	10
AA, SC	3,3'-Dimethylbenzidine	119-93-7	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-.	8270	10
SC	alpha, alpha-Dimethylphenethylamine	122-09-8	Benzeneethanamine,αα-dimethyl-	8270	10
A	2,4-Dimethylphenol	105-67-9	Phenol, 2,4-dimethyl-	8040 8270	5 10
A, NM	Dimethyl phthalate	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester	8060 8270	5 10
AA	m-Dinitrobenzene	99-65-0	Benzene, 1,3-dinitro-	8270	10
A	4,6-Dinitro-o-cresol	534-52-1	Phenol, 2-methyl-4,6-dinitro-	8040 8270	150 50
A	2,4-Dinitrophenol	51-28-5	Phenol, 2,4-dinitro-	8040 8270	150 50
A	2,4-Dinitrotoluene	121-14-2	Benzene, 1-methyl-2,4-dinitro-	8090 8270	0.2 10
A	2,6-Dinitrotoluene	606-20-2	Benzene, 2-methyl-1,3-dinitro-	8090 8270	0.1 10
P	Dinoseb; DNBP; 2-sec-Butyl-4,6-dinitrophenol	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-	8150 8270	1 10
A, NM	Di-n-octyl phthalate	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester	8060 8270	30 10
SC-S	1,4-Dioxane	123-91-1	1,4-Dioxane	8015	150
AA, SC	Diphenylamine	122-39-4	Benzenamine, N-phenyl-	8270	10
P	Disulfoton	298-04-4	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl]ester	8140 8270	2 10
P	Endosulfan I	959-98-8	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3α,5aß,6aα,9α,9aß)-	8080 8250	0.1 10

P,A	Endosulfan II	33213-65-9	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3α,5aα,6ß,9ß,9aα)-	8080	0.05
P,A	Endosulfan sulfate	1031-07-8	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3,3-dioxide	8080 8270	0.5 10
N.M, P,A	Endrin	72-20-8	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aα,2ß,2aß,3α,6α,6aß,7ß,7aα)-	8080 8250	0.1 10
P,A	Endrin aldehyde	7421-93-4	1,2,4-Methenocyclopenta[cd]pentalene-5-carboxaldehyde, 2,2a,3,3,4,7-hexachlorodecahydro-, (1α,2ß,2aß,4ß,4aß,5ß,6aß,6bß,7R*)-	8080 8270	0.2 10
A	Ethylbenzene	100-41-4	Benzene, ethyl-	8020 8240	2 5
AA, SC	Ethyl methacrylate	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester	8015 8240 8270	10 5 10
SC	Ethyl methanesulfonate	62-50-0	Methanesulfonic acid, ethyl ester	8270	10
P	Famphur	52-85-7	Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl]-O,O-dimethyl ester	8270	10
A, N.M	Fluoranthene	206-44-0	Fluoranthene	8100 8270	200 10
A, N.M	Fluorene	86-73-7	9H-Fluorene	8100 8270	200 10
P, N.M	Heptachlor	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-	8080 8270	0.05 10
P, N.M	Heptachlor epoxide	1024-57-3	2,5-Methano-2H-indeno [1,2-b]oxirene,2,3,4,5,6,7,7-heptachloro-1a,1b,5,5a,6,6a,-hexahydro-, (1aα,1bß,2α,5α,5aß,6ß,6aα)	8080 8270	1 10
A	Hexachlorobenzene	118-74-1	Benzene, hexachloro-	8120 8270	0.5 10
A	Hexachlorobutadiene	87-68-	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	8120 8270	5 10

A	Hexachloro-cyclopentadiene	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	8120 8270	5 10
A	Hexachloroethane	67-72-1	Ethane, hexachloro-	8120 8270	0.5 10
SC	Hexachlorophene	70-30-4	Phenol, 2,2'-methylenebis [3,4,6-trichloro-	8270	10
SC	Hexachloropropene	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-	8270	10
A A	2-Hexanone	591-78-6	2-Hexanone	8240	50
A, N.M	Indeno(1,2,3-cd)pyrene	193-39-5	Indeno [1,2,3-cd]pyrene	8100 8270	200 10
OX	Isobutyl alcohol	78-83-1	1-Propanol, 2-methyl-	8015	50
A A, P, N.M	Isodrin	465-73-6	1,4,5,8-Dimethanonaphthalene,1,2,3,4,10, 10-hexachloro-1, 4,4a,5,8,8a hexahydro-(1α,4α,4aß,5ß,8ß,8aß)-	8270	10
A	Isophorone	78-59-1	2-Cyclohexen-1-one, 3,5,5-trimethyl-	8090 8270	60 10
SC	Isosafrole	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-	8270	10
P, N.M	Kepone	143-50-0	1,3,4-Metheno-2H-cyclobuta-[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-	8270	10
A	Lead	(Total)	Lead	6010 7420 7421	40 1,000 10
A	Mercury	(Total)	Mercury	7470	2
SC	Methacrylonitrile	126-98-7	2-Propenenitrile, 2-methyl-	8015 8240	5 5
SC	Methapyrilene	91-80-5	1,2,Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-	8270	10
P	Methoxychlor	72-43-5	Benzene, 1,1'-(2,2,2,trichloroethylidene)bis [4-methoxy-	8080 8270	2 10
A, HVD	Methyl bromide; Bromomethane	74-83-9	Methane, bromo-	8010 8240	20 10
A, HVD	Methyl chloride; Chloromethane	74-87-3	Methane, chloro-	8010 8240	1 10
AA, N.M	3-Methylcholanthrene	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	8270	10
A A	Methylene bromide; Dibromomethane	74-95-3	Methane, dibromo-	8010 8240	15 5

A	Methylene chloride; Dichloromethane	75-09-2	Methane, dichloro-	8010 8240	5 5
AA	Methyl ethyl ketone; MEK	78-93-3	2-Butanone	8015 8240	10 100
HYD	Methyl iodide; Iodomethane	74-88-4	Methane, iodo-	8010 8240	40 5
OX, SC	Methyl methacrylate	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester	8015 8240	2 5
SC	Methyl methanesulfonate	66-27-3	Methanesulfonic acid, methyl ester	8270	10
AA	2-Methylnaphthalene	91-57-6	Naphthalene, 2-methyl-	8270	10
P HYD	Methyl parathion; Parathion methyl	298-00-0	Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester	8140 8270	0.5 10
AA	4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1	2-Pentanone, 4-methyl-	8015 8240	5 50
A	Naphthalene	91-20-3	Naphthalene	8100 8270	200 10
AA	1,4-Naphthoquinone	130-15-4	1,4-Naphthalenedione	8270	10
AA	1-Naphthylamine	134-32-7	1-Naphthalenamine	8270	10
AA	2-Naphthylamine	91-59-8	2-Naphthalenamine	8270	10
A	Nickel	(Total)	Nickel	6010 7520	50 400
AA	o-Nitroaniline	88-74-4	Benzenamine, 2-nitro-	8270	50
AA	m-Nitroaniline	99-09-2	Benzenamine, 3-nitro-	8270	50
AA	p-Nitroaniline	100-01-6	Benzenamine, 4-nitro-	8270	50
A	Nitrobenzene	98-95-3	Benzene, nitro-	8090 8270	40 10
A	o-Nitrophenol	88-75-5	Phenol, 2-nitro-	8040 8270	5 10
A	p-Nitrophenol	100-02-7	Phenol, 4-nitro-	8040 8270	10 50
AA, SC	4-Nitroquinoline 1-oxide	56-57-5	Quinoline, 4-nitro-, 1-oxide	8270	10
AA	N-Nitrosodi-n-butylamine	924-16-3	1-Butanamine, N-butyl-N-nitroso-	8270	10

A A	N-Nitrosodiethylamine	55-18-5	Ethanamine, N-ethyl-N-nitroso-	8270	10
A	N-Nitrosodimethylamine	62-75-9	Methanamine, N-methyl-N-nitroso-	8270	10
A	N-Nitrosodiphenylamine	86-30-6	Benzenamine, N-nitroso-N-phenyl-	8270	10
A	N-Nitrosodipropylamine; Di-n-propylnitrosamine	621-64-7	1-Propanamine, N-nitroso-N-propyl-	8270	10
A, SC	N-Nitrosomethylethylamine	10595-95-6	Ethanamine, N-methyl-N-nitroso-	8270	10
SC	N-Nitrosomorpholine	59-89-2	Morpholine, 4-nitroso-	8270	10
SC	N-Nitrosopiperidine	100-75-4	Piperidine, 1-nitroso-	8270	10
SC	N-Nitrosopyrrolidine	930-55-2	Pyrrolidine, 1-nitroso-	8270	10
SC	5-Nitro-o-toluidine	99-55-8	Benzenamine, 2-methyl-5-nitro-	8270	10
HYD, P	Parathion	56-38-2	Phosphorothioic acid, O,O-diethyl-O-(4-nitrophenyl) ester	8270	10
NM, A	Polychlorinated biphenyls; PCBs	See Note 7	1,1'-Biphenyl, chloro derivatives	8080 8250	50 100
NM, A	Polychlorinated dibenzo-p-dioxins; PCDDs	See Note 8	Dibenzo[b,e] [1,4]dioxin, chloro derivatives	8280	0.01
NM, A	Polychlorinated dibenzofurans; PCDFs	See Note 9	Dibenzofuran, chloro derivatives	8280	0.01
NM, A A	Pentachlorobenzene	608-93-5	Benzene, pentachloro-	8270	10
A A	Pentachloroethane	76-01-7	Ethane, pentachloro-	8240 8270	5 10
P	Pentachloronitrobenzene	82-68-8	Benzene, pentachloronitro-	8270	10
A, P, SC	Pentachlorophenol	87-86-5	Phenol, pentachloro-	8040 8270	5 50
SC - M	Phenacetin	62-44-2	Acetamide, N-(4-ethoxyphenyl)	8270	10
A, NM	Phenanthrene	85-01-8	Phenanthrene	8100 8270	200 10
A, OX	Phenol	108-95-2	Phenol	8040 8270	1 10
OX, SC	p-Phenylenediamine	106-50-3	1,4-Benzenediamine	8270	10
P	Phorate	298-02-2	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester	8140 8270	2 10

SC-S	2-Picoline	109-06-8	Pyridine, 2-methyl-	8240	5
				8270	10
P	Pronamide	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	8270	10
AA	Propionitrile; Ethyl cyanide	107-12-0	Propanenitrile	8015	60
				8240	5
A, NM	Pyrene	129-00-0	Pyrene	8100	200
				8270	10
AA	Pyridine	110-86-1	Pyridine	8240	5
				8270	10
SC	Safrole	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-	8270	10
A	Selenium	(Total)	Selenium	6010	750
				7740	20
				7741	20
A	Silver	(Total)	Silver	6010	70
				7760	100
P	Silvex; 2,4,5-TP	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-	8150	2
SC, CX	Styrene	100-42-5	Benzene, ethenyl-	8020	1
				8240	5
	Sulfide	18496-25-8	Sulfide	9030	10,000
P	2,4,5-T; 2,4,5-Trichlorophenoxy-acetic acid	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-	8150	2
A	2,3,7,8-TCDD; 2,3,7,8-Tetra-chlorodibenzo-p-dioxin	1746-01-6	Dibenzo[b,e][1,4]dioxin, 2,3,7,8-tetrachloro-	8280	0.005
AA	1,2,4,5-Tetrachlorobenzene	95-94-3	Benzene, 1,2,4,5-tetrachloro-	8270	10
A	1,1,1,2-Tetrachloroethane	630-20-6	Ethane, 1,1,1,2-tetrachloro-	8010	5
				8240	5
A	1,1,2,2-Tetrachloroethane	79-34-5	Ethane, 1,1,2,2-tetrachloro-	8010	0.5
				8240	5
A	Tetrachloroethylene; Perchloroethylene; Tetrachloroethene	127-18-4	Ethene, tetrachloro-	8010	0.5
				8240	5
AA	2,3,4,6-Tetrachlorophenol	58-90-2	Phenol, 2,3,4,6-tetrachloro-	8270	10

P	Tetraethyl dithio-pyrophosphate; Sulfotepp	3689-24-5	Thiodiphosphoric acid ($[(HO)_2P(S)]_2O$), tetraethyl ester	8270	10
A	Thallium	(Total)	Thallium	6010	400
				7840	1,000
				7841	10
A	Tin	(Total)	Tin	7870	8,000
A	Toluene	108-88-3	Benzene, methyl-	8020	2
				8240	5
AA, SC	o-Toluidine	95-53-4	Benzenamine, 2-methyl-	8270	10
P	Toxaphene	8001-35-2	Toxaphene	8080	2
				8250	10
A	1,2,4- Trichlorobenzene	120-82-1	Benzene, 1,2,4-trichloro-	8270	10
A	1,1,1-Trichloroethane; Methylchloroform	71-55-6	Ethane, 1,1,1-trichloro-	8240	5
A	1,1,2-Trichloroethane	79-00-5	Ethane, 1,1,2-trichloro-	8010	0.2
				8240	5
A	Trichloroethylene; Trichloroethene	79-01-6	Ethene, trichloro-	8010	1
				8240	5
A	Trichlorofluoromethane	75-69-4	Methane, trichlorofluoro-	8010	10
				8240	5
A	2,4,5-Trichlorophenol	95-95-4	Phenol, 2,4,5-trichloro-	8270	10
A	2,4,6-Trichlorophenol	88-06-2	Phenol, 2,4,6-trichloro-	8040	5
				8270	10
AA	1,2,3-Trichloropropane	96-18-4	Propane, 1,2,3-trichloro-	8010	10
				8240	5
P	O,O,O-Triethyl phosphorothioate	126-68-1	Phosphorothioic acid, O,O,O-triethyl ester	8270	10
A	sym-Trinitrobenzene	99-35-4	Benzene, 1,3,5-trinitro-	8270	10
A	Vanadium	(Total)	Vanadium	6010	80
				7910	2,000
				7911	40
AA, SC	Vinyl acetate	108-05-4	Acetic acid, ethenyl ester	8240	5
A	Vinyl chloride	75-01-4	Ethene, chloro-	8010	2
				8240	10
A	Xylene (total)	1330-20-7	Benzene, dimethyl-	8020	5
				8240	5
A	Zinc	(Total)	Zinc	6010	20
				7950	50

NOTES:

1 The regulatory requirements pertain only to the list of substances; the right hand columns (Methods and PQL) are given for informational purposes only. See also footnotes 5 and 6.

2 Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

3 Chemical Abstracts Service registry number. Where 'Total' is entered, all species in the ground water that contain this element are included.

4 CAS index names are those used in the 9th Cumulative Index.

5 Suggested Methods refer to analytical procedure numbers used in EPA Report SW-846 'Test Methods for Evaluating Solid Waste', third edition, November 1986. Analytical details can be found in SW-846 and in documentation on file at the agency. CAUTION: The methods listed are representative SW-846 procedures and may not always be the most suitable method(s) for monitoring an analyte under the regulations.

6 Practical Quantitation Limits (PQLs) are the lowest concentrations of analytes in ground waters that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions. The PQLs listed are generally stated to one significant figure. CAUTION: The PQL values in many cases are based only on a general estimate for the method and not on a determination for individual compounds; PQLs are not a part of the regulation.

7 Polychlorinated biphenyls (CAS RN 1336-36-3); this category contains congener chemicals, including constituents of Aroclor-1016 (CAS RN 12674-11-2), Aroclor-1221 (CAS RN 11104-28-2), Aroclor-1232 (CAS RN 11141-16-5), Aroclor-1242 (CAS RN 53469-21-9), Aroclor-1248 (CAS RN 12672-29-6), Aroclor-1254 (CAS RN 11097-69-1), and Aroclor-1260 (CAS RN 11096-82-5). The PQL shown is an average value for PCB congeners.

8 This category contains congener chemicals, including tetrachlorodibenzo-p-dioxins (see also 2,3,7,8-TCDD), pentachlorodibenzo-p-dioxins, and hexachlorodibenzo-p-dioxins. The PQL shown is an average value for PCDD congeners.

9 This category contains congener chemicals, including tetrachlorodibenzofurans, pentachlorodibenzofurans, and hexachlorodibenzofurans. The PQL shown is an average value for PCDF congeners.

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ATTACHMENT E-3

ESE CRL/PQL COMPARISON REPORT

DETECTION LIMIT/REPORTING VALUES FOR TOOELE ARMY DEPOT; NORTH AREA AND SOUTH AREA

January 3, 1994

DETECTION LIMIT/REPORTING VALUES FOR TOOELE ARMY DEPOT; NORTH AREA AND SOUTH AREA

January 3, 1994

PRESENTED TO: U.S. ARMY ENVIRONMENTAL CENTER
PREPARED FOR: MONTGOMERY WATSON AND ENSERCH (EBASCO)
PREPARED BY: ENVIRONMENTAL SCIENCE & ENGINEERING

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1.0 INTRODUCTION

1.0.0.1 This report has been prepared by Environmental Science & Engineering (ESE), Gainesville, Florida, in response to correspondence dated October 5, 1993 from Mary Ellen Maly of the United States Army Environmental Center (USAEC) to Mr. Charles Haddox of ENSERCH ENVIRONMENTAL CORPORATION (ENSERCH), formerly the environmental division of EBASCO SERVICES INCORPORATED. Ms. Maly was requesting assistance in responding to a problem identified between USAEC analytical procedures and State of Utah requirements for analytical data. A copy of this correspondence is included in Appendix I. The subject of this correspondence was the detection limits to be used in the analytical program for projects at the Tooele Army Depot (TEAD) in Utah. These projects include the TEAD-South Area Group 2 Suspected Releases Units Phase II RCRA Facility Investigation (RFI) and the TEAD-North Area Phase II RFI, Group A Suspected Releases Solid Waste Management Units (SWMUs).

1.0.0.2 The State of Utah requires that all analytical values greater than US Environmental Protection Agency (USEPA) Test Methods for Evaluating Solid Waste Physical/Chemical (SW-846, USEPA, 1986) practical quantitation limits (PQLs) be reported. The USAEC analytical program has determined a separate set of reporting limits, certified reporting limits (CRLs), to be used in their analytical program. This report includes the results of the evaluation and comparison of the two programs and details the procedures to be used to ensure reporting of data that meets the State of Utah's requirement. ESEs efforts on resolving this problem between SW-846 PQLs and USAEC CRLs began in early October, 1993.

1.1 SUMMARY OF RESULTS

1.1.0.1 Based on the detection limit review and comparison included with this report, ESE believes that by using the USAEC analytical methods, the SW-846 PQLs can be met or exceeded for 418 of 422 analytes and compounds included in the TEAD programs. Due to specifications required in the USAEC methods, ESE believes that meeting SW-846 PQLs for two metals and two semivolatiles in soil are not possible. The analytes and compounds that can not be reported reliably with USAEC procedures to SW-846 PQLs included the following analytes.

LM18	33DCBD	3,3-Dichlorobenzidine
	CL6CP	Hexachlorocyclopentadiene
JS16	TL	Thallium
	PB	Lead

1.2 SCREENING/EVALUATION PROCESS FOR DETERMINING REPORTING LIMITS

1.2.0.1 The remaining portions of this report are organized in order to demonstrate and summarize the screening process ESE followed to evaluate the detection limits and reporting values for the TEAD projects. Section 2.0 includes the criteria and guidance provided by the USAEC for determining reporting limits. Section 3.0 presents in tabular form the results of the evaluation and elimination of compounds and analytes that yielded the results discussed in Section 1.1. Section 4.0 describes how the data will be transmitted to the IRDMIS and clients.

2.0 GUIDANCE FROM USAEC

2.0.0.1 Stated below are the guidelines provided for entry of data into the Installation Restoration Data Management Information System (IRDMIS) as dictated by the cited correspondence.

1. Use normal reporting methods when the USAEC CRL is below the SW-846 PQL.

2. When one-half of the CRL (criteria of detection, COD) is below the SW-846 PQL use the flagging codes of "J" and "P". (Note: USAEC now requires the use of the flagging code "1". The "J" and "P" flags were used for pre-1993 QA Plans. This information was obtained from USAEC on 02/18/94. See Appendix 1.)

3. When the COD is above the SW-846 PQL the laboratory must demonstrate, by spiking, the ability to accurately report to the lower levels.

4. To demonstrate this ability, four standard matrix spikes will be performed, two blanks and two spiked at the SW-846 PQL. Numerical values and interpretation will be reported to the IRDMIS Division. (Note: the letter provides no guidance for strict interpretation of the results other than to demonstrate the ability to distinguish between the samples so that no false positives or false negatives are present.)

5. Since values greater than the PQL and less than the COD cannot be submitted to the IRDMIS, a report will be generated and submitted to the client separately.

2.0.0.2 ESE would like to point out that the quantitation limits found in SW-846 are provided as estimates only and are not to be used as strict limits of detection achievable at times for all matrices. This disclaimer is reiterated several times in the SW-846 document itself. Copies of these disclaimers are included in this report in Appendix II. These disclaimers are present for the following reasons:

1. Sample estimated quantitation limits (EQLs) are based on wet weight for soils and sediment. Actual quantitation limits will therefore be higher when corrected for percent moisture as required by the USAEC.

2. EQLs are highly matrix dependent and are therefore listed for guidance only.

2.0.0.3 ESE would also like to draw attention to the fact that it has been requested to perform strict USAEC methodologies for these projects. Differences between USAEC and SW-846 methods can make it extremely difficult to achieve the EQLs and PQLs listed in SW-846.

2.0.0.4 The CRLs and CODs for USAEC methods cited in this report have been taken from the USAEC certification program. The EQLs and PQLs have been taken from SW-846, 3rd edition. The contract required detection limits (CRDLs) for the metals were obtained from the Contract Laboratory Program (CLP) Statement of Work (SOW) for Inorganic Analyses, July 1988.

3.0 ANALYTE AND COMPOUND SCREENING DISCUSSION

3.0.0.1 The following table contains a listing of the USAEC and corresponding SW-846 analytical methods included in this evaluation.

USAEC METHOD	SW846/EPA METHOD
JS16/SS10	6010
JB01/SB01	7470/7471
SD09	7841
SD20/JD17	7421
SD21/JD15	7740
SD22/JD19	7060
KF10/TF22	9200
KF14/TF27	365.1
KT05/TT10	9035/9250
KY01/TF18	9010
LH10/UH13	8080
LH16/UH02	8080
LM18UM18	8270
LM19/UM20	8240
LW12/UW32	8330

3.0.0.2 Table 3-1 contains the full analyte and compound list for the methods used in the current efforts at TEAD-North and South Areas. The current CRLs, CODs, and SW-846 PQLs are listed on this table. In subsequent parts of this report, analytes and compounds will be systematically deleted from this list to obtain a final list of analytes and compounds that this laboratory has conducted spiking analyses on to demonstrate the ability or inability to discriminate between false positives and false negatives. Blanks in the table indicate that values were not available for that parameter or item. These are described with the appropriate note found at the end of Table 3-1.

TABLE 3-1 METHOD AND ANALYTE LIST: FULL LIST

USAEC Method No.	Test Name	Analyte Name	CRL	COD	PQL
Metals in Soil			(µg/g)	(µg/g)	(µg/g)
JB01	HG	MERCURY	0.05	0.025	0.04
JD15	SE	SELENIUM	0.25	0.125	1
JD19	AS	ARSENIC	0.25	0.125	2
JD17	PB	LEAD	0.177	0.0885	0.6
JS16	AG	SILVER	0.589	0.2945	2
JS16	AL	ALUMINUM	2.35	1.175	4
JS16	BA	BARIUM	5.18	2.59	40
JS16	BE	BERYLLIUM	0.5	0.25	1
JS16	CA	CALCIUM	100	50	1000
JS16	CD	CADMIUM	0.7	0.35	1
JS16	CO	COBALT	1.42	0.71	10
JS16	CR	CHROMIUM	4.05	2.025	2
JS16	CU	COPPER	0.965	0.4825	5
JS16	FE	IRON	3.68	1.84	20
JS16	K	POTASSIUM	100	50	1000
JS16	MG	MAGNESIUM	100	50	1000
JS16	MN	MANGANESE	2.05	1.025	3
JS16	NA	SODIUM	100	50	1000
JS16	NI	NICKEL	1.71	0.855	8
JS16	PB	LEAD	10.5	5.25	0.6
JS16	SB	ANTIMONY	7.14	3.57	12
JS16	TL	THALLIUM	6.62	3.31	2
JS16	V	VANADIUM	3.39	1.695	10
JS16	ZN	ZINC	8.03	4.015	4
Cyanide in Soil					
KY01	CYN	CYANIDE	0.092	0.046	0.25
Organochlorine Pesticides in Soil					
LH10	ABHC	BHC,A	0.00907	0.004535	0.00201
LH10	AENSLF	ENDOSULFAN,A	0.00602	0.00301	0.00938
LH10	ALDRN	ALDRIN	0.00729	0.003645	0.00268
LH10	BBHC	BHC,B	0.00257	0.001285	0.00603
LH10	BENSLF	ENDOSULFAN,B	0.00663	0.003315	0.00268
LH10	CLDAN	CHLORDANE	0.0177	0.00885	0.00938
LH10	DBHC	BHC,D	0.00555	0.002775	0.00603
LH10	DLDRN	DIELDRIN	0.00629	0.003145	0.00134
LH10	ENDRN	ENDRIN	0.0024	0.0012	0.00402
LH10	ENDRNA	ENDRIN ALDEHYDE	0.024	0.012	0.01541
LH10	ESFSO4	ENDOSULFAN SULFATE	0.00763	0.003815	0.04422
LH10	HPCL	HEPTACHLOR	0.00618	0.00309	0.00201
LH10	HPCLE	HEPTACHLOR EPOXIDE	0.0062	0.0031	0.05561
LH10	ISODR	ISODRIN	0.00461	0.002305	[1]
LH10	LIN	BHC,G	0.00638	0.00319	0.00268
LH10	MEXCLR	METHOXYCHLOR	0.0711	0.03555	0.11792
LH10	PPDDD	DDD,PP'	0.00826	0.00413	0.00737
LH10	PPDDE	DDE,PP'	0.00765	0.003825	0.00268
LH10	PPDDT	DDT,PP'	0.00707	0.003535	0.00804
LH10	TXPHEN	TOXAPHENE	0.444	0.222	0.13668
PCB's in soil					
LH16	PCB016	Aroclor-1016	0.0666	0.0333	[1]
LH16	PCB221	Aroclor-1221	[2]		[1]
LH16	PCB232	Aroclor-1232	[2]		[1]
LH16	PCB242	Aroclor-1242	[2]		0.0435
LH16	PCB248	Aroclor-1248	[2]		[1]
LH16	PCB254	Aroclor-1254	[2]		[1]
LH16	PCB260	Aroclor-1260	0.0804	0.0402	[1]

TABLE 3-1 METHOD AND ANALYTE LIST: FULL LIST

USAEC Method No.	Test Name	Analyte Name	CRL	COD	PQL
Semivolatiles in Soil			(µg/g)	(µg/g)	(µg/g)
LM18	124TCB	1,2,4-TRICHLOROBENZENE	0.04	0.02	0.66
LM18	12DCLB	1,2-DICHLOROBENZENE	0.11	0.055	0.66
LM18	12DPH	1,2-DIPHENYL HYDRAZINE	[2]		
LM18	13DCLB	1,3-DICHLOROBENZENE	0.13	0.065	0.66
LM18	14DCLB	1,4-DICHLOROBENZENE	0.098	0.049	0.66
LM18	245TCP	2,4,5-TRICHLOROPHENOL	0.1	0.05	0.66
LM18	246TBP	2,4,6-TRIBROMOPHENOL	0.38	0.19	[1]
LM18	246TCP	2,4,6-TRICHLOROPHENOL	0.17	0.085	0.66
LM18	24DCLP	2,4-DICHLOROPHENOL	0.18	0.09	0.66
LM18	24DMPN	2,4-DIMETHYLPHENOL	0.69	0.345	0.66
LM18	24DNP	2,4-DINITROPHENOL	1.2	0.6	3.3
LM18	24DNT	2,4-DINITROTOLUENE	0.14	0.07	0.66
LM18	26DNT	2,6-DINITROTOLUENE	0.085	0.0425	0.66
LM18	2CLP	2-CHLOROPHENOL	0.06	0.03	0.66
LM18	2CNAP	2-CHLORONAPHTHALENE	0.036	0.018	0.66
LM18	2FBP	FLUOROBIPHENYL	0.021	0.0105	[1]
LM18	2FP	2-FLUOROPHENOL	0.17	0.085	[1]
LM18	2MNAP	2-METHYLNAPHTHLENE	0.049	0.0245	0.66
LM18	2MP	2-METHYLPHENOL	0.029	0.0145	0.66
LM18	2NANIL	2-NITROANILINE	0.062	0.031	3.3
LM18	2NP	2-NITROPHENOL	0.14	0.07	0.66
LM18	33DCBD	3,3-DICHLOROBENZIDINE	6.3	3.15	1.3
LM18	3NANIL	3-NITROANILINE	0.45	0.225	3.3
LM18	46DN2C	2-METHYL-4,6-DINITROPHENOL	0.55	0.275	3.3
LM18	4BRPPE	4-BROMOPHENYLPHENYL ETHER	0.33	0.165	0.66
LM18	4CANIL	4-CHLOROANILINE	0.81	0.405	1.3
LM18	4CL3C	3-METHYL-4-CHLOROPHENOL	0.095	0.0475	1.3
LM18	4CLPPE	4-CHLOROPHENYLPHENYL ETHER	0.033	0.0165	0.66
LM18	4MP	4-METHYLPHENOL	0.24	0.12	0.66
LM18	4NANIL	4-NITROANILINE	0.41	0.205	[1]
LM18	4NP	4-NITROPHENOL	1.4	0.7	3.3
LM18	ABHC	BHC, A	[3]		
LM18	AENSLF	ENDOSULFAN A	[3]		
LM18	ALDRN	ALDRIN	[3]		
LM18	ANAPNE	ACENAPHTHENE	0.036	0.018	0.66
LM18	ANAPYL	ACENAPHTHYLENE	0.033	0.0165	0.66
LM18	ANTRC	ANTHRACENE	0.033	0.0165	0.66
LM18	B2CEXM	BIS(2-CHLOROETHOXY) METHANE	0.059	0.0295	0.66
LM18	B2CIPE	BIS(2-CHLOROISOPROPYL) ETHER	0.2	0.1	0.66
LM18	B2CLEE	BIS(2-CHLOROETHYL) ETHER	0.033	0.0165	0.66
LM18	B2EHP	BIS(2-EHTYLHEXYL) PHTHALATE	0.62	0.31	0.66
LM18	BAANTR	BENZO [A] ANTHRACENE	0.17	0.085	0.66
LM18	BAPYR	BENZO [A] PYRENE	0.25	0.125	0.66
LM18	BBFANT	BENZO [B] FLUORANTHENE	0.21	0.105	0.66
LM18	BBHC	BHC, B	[3]		
LM18	BBZP	BUTYLBENZYL PHTHALATE	0.17	0.085	0.66
LM18	BENSLF	ENDOSULFAN B	[3]		
LM18	BENZID	BENZIDINE	[2]		
LM18	BENZOA	BENZOIC ACID	[2]		3.3
LM18	BGHIPY	BENZO [G,H,I] PERYLENE	0.25	0.125	0.66
LM18	BKFANT	BENZO [K] FLUORANTHENE	0.066	0.033	0.66
LM18	BZALC	BENZYL ALCOHOL	0.19	0.095	1.3
LM18	CHRY	CHRYSENE	0.12	0.06	0.66
LM18	CL6BZ	HEXACHLOROBENZENE	0.033	0.0165	0.66
LM18	CL6CP	HEXACHLOROCYCLOPENTADIENE	6.2	3.1	0.66
LM18	CL6ET	HEXACHLOROETHANE	0.15	0.075	0.66
LM18	CLDANA	CHLORDANE, ALPHA	[3]		
LM18	CLDANG	CHLORDANE, GAMMA	[3]		
LM18	DBAHA	DIBENZ [A,H] ANTHRACENE	0.21	0.105	0.66
LM18	DBHC	BHC, D	[3]		
LM18	DBZFUR	DIBENZOFURAN	0.035	0.0175	0.66
LM18	DEP	DIETHYL PHTHALATE	0.24	0.12	0.66
LM18	DLDRN	DIELDRIN	[3]		
LM18	DMP	DIMETHYL PHTHALATE	0.17	0.085	0.66
LM18	DNBP	DI-N-BUTYL PHTHALATE	0.061	0.0305	
LM18	DNOP	DI-N-OCTYL PHTHALATE	0.19	0.095	0.66
LM18	ENDRIN	ENDRIN	[3]		
LM18	ENDRNA	ENDRIN ALDEHYDE	[3]		

TABLE 3–1 METHOD AND ANALYTE LIST: FULL LIST

USAEC Method No.	Test Name	Analyte Name	CRL	COD	PQL
Semivolatiles in Soil (continued)			(µg/g)	(µg/g)	(µg/g)
LM18	ESFSO4	ENDOSULFAN SULFATE	[3]		
LM18	FANT	FLUORANTHENE	0.068	0.034	0.66
LM18	FLRENE	FLUORENE	0.033	0.0165	0.66
LM18	GBHC	BHC, G (LINDANE)	[3]		
LM18	HCBD	HEXACHLOROBUTADIENE	0.23	0.115	0.66
LM18	HPCL	HEPTACHLOR	[3]		
LM18	HPCLE	HEPTACHLOR EPOXIDE	[3]		
LM18	ICDPYR	INDENO [1,2,3–CD] PYRENE	0.29	0.145	0.66
LM18	ISOPHR	ISOPHORONE	0.033	0.0165	0.66
LM18	KEND	ENDRIN KETONE	[3]		
LM18	MEXCLR	METHOXYCHLOR	[3]		
LM18	NAP	NAPHTHALENE	0.037	0.0185	0.66
LM18	NB	NITROBENZENE	0.045	0.0225	0.66
LM18	NBD5	NITROBENZENE–D(5)	0.025	0.0125	sur,[1]
LM18	NNDMEA	N–NITROSODIMETHYLAMINE	[2]		
LM18	NNDNPA	N–NITROSO, DI–N–PROPYLAMINE	0.2	0.1	0.66
LM18	NNDPA	N–NITROSODIPHENYLAMINE	0.19	0.095	0.66
LM18	PCB016	PCB–1016	[3]		
LM18	PCB221	PCB–1221	[3]		
LM18	PCB232	PCB–1232	[3]		
LM18	PCB242	PCB–1242	[3]		
LM18	PCB248	PCB–1248	[3]		
LM18	PCB254	PCB–1254	[3]		
LM18	PCB260	PCB–1260	[3]		
LM18	PCP	PENTACHLOROPHENOL	1.3	0.65	3.3
LM18	PHANTR	PHENANTHRENE	0.033	0.0165	0.66
LM18	PHEND6	PHENOL–D(6)	0.23	0.115	sur,[1]
LM18	PHENOL	PHENOL	0.11	0.055	0.66
LM18	PPDDD	DDD, PP	[3]		
LM18	PPDDE	DDE, PP	[3]		
LM18	PPDDT	DDT, PP	[3]		
LM18	PYR	PYRENE	0.033	0.0165	0.66
LM18	TRPD14	TERPHENYL–D(14)	0.34	0.17	sur,[1]
LM18	TXPHEN	TOXAPHENE	[3]		
Volatile Organics in Soil					
LM19	111TCE	1,1,1–TRICHLOROETHANE	0.0044	0.0022	0.005
LM19	112TCE	1,1,2–TRICHLOROETHANE	0.0054	0.0027	0.005
LM19	11DCE	1,1–DICHLOROETHENE	0.0039	0.00195	0.005
LM19	11DCLE	1,1–DICHLOROETHANE	0.0023	0.00115	0.005
LM19	12DCD4	1,2–DICHLOROETHENE–D(4)	0.0032	0.0016	0.005
LM19	12DCE	1,2–DICHLOROETHENE	0.003	0.0015	0.005
LM19	12DCLE	1,2–DICHLOROETHANE	0.0017	0.00085	0.005
LM19	12DCLP	1,2–DICHLOROPROPANE	0.0029	0.00145	0.005
LM19	2CLEVE	2–CHLOROETHYLVINYL ETHER	[2]		0.01
LM19	4BFB	4–BROMOFLUOROBENZENE	0.0029	0.00145	[1]
LM19	ACET	ACETONE	0.017	0.0085	0.1
LM19	ACROLN	ACROLEIN	[2]		
LM19	ACRYLO	ACRYLONITRILE	[2]		
LM19	BRDCLM	BROMODICHLOROMETHANE	0.0029	0.00145	0.005
LM19	C13DCP	CIS–1,3–DICHLOROPROPENE	0.0032	0.0016	0.005
LM19	C2AVE	VINYL ACETATE	0.0032	0.0016	0.05
LM19	C2H3CL	VINYL CHLORIDE	0.0062	0.0031	0.01
LM19	C2H5CL	CHLOROETHANE	0.012	0.006	0.01
LM19	C6H6	BENZENE	0.0015	0.00075	0.005
LM19	CCL3F	TRICHLOROFLUOROMETHANE	0.0059	0.00295	[1]
LM19	CCL4	CARBON TETRACHLORIDE	0.007	0.0035	0.005
LM19	CH2CL2	METHYLENE CHLORIDE	0.012	0.006	0.005
LM19	CH3BR	BROMOMETHANE	0.0057	0.00285	0.01
LM19	CH3CL	CHLOROMETHANE	0.0088	0.0044	0.01
LM19	CHBR3	BROMOFORM	0.0069	0.00345	0.005
LM19	CHCL3	CHLOROFORM	0.00087	0.000435	0.005
LM19	CL2BC	DICHLOROBENZENE (TOTAL)	[2]		
LM19	CLC6H5	CHLOROBENZENE	0.00086	0.00043	0.005
LM19	CS2	CARBON DISULFIDE	0.0044	0.0022	0.1

TABLE 3-1 METHOD AND ANALYTE LIST: FULL LIST

USAEC Method No.	Test Name	Analyte Name	CRL	COD	PQL
Volatile Organics in Soil (continued)			(µg/g)	(µg/g)	(µg/g)
LM19	DBRCLM	DIBROMOCHLOROMETHANE	0.0031	0.00155	0.005
LM19	ETC6H5	ETHYLBENZENE	0.0017	0.00085	0.005
LM19	MEC6D8	TOLUENE-D(8)	0.0015	0.00075	sur,[1]
LM19	MEC6H5	TOLUENE	0.00078	0.00039	0.005
LM19	MEK	METHYL ETHYL KETONE	0.07	0.035	0.1
LM19	MIBK	METHYL ISOBUTYL KETONE	0.027	0.0135	0.05
LM19	MNBK	METHYL-N-BUTYL KETONE	0.032	0.016	0.05
LM19	STYR	STYRENE	0.0026	0.0013	0.005
LM19	T13DCP	TRANS-1,3-DICHLOROPROPENE	0.0028	0.0014	0.005
LM19	TCLEA	1,1,2,2-TETRACHLOROETHANE	0.0024	0.0012	0.005
LM19	TCLEE	TETRACHLOROETHENE	0.00081	0.000405	0.005
LM19	TRCLE	TRICHLOROETHENE	0.0028	0.0014	0.005
LM19	XYLEN	XYLENES (TOTAL)	0.0015	0.00075	0.005
Explosives in Soil					
LW12	135TNB	1,3,5-TRINITROBENZENE	0.488	0.244	0.25
LW12	13DNB	1,3-DINITROBENZENE	0.496	0.248	0.25
LW12	246TNT	2,4,6-TRINITROTOLUENE	0.456	0.228	0.25
LW12	24DNT	2,4-DINITRITOLUENE	0.424	0.212	0.25
LW12	26DNT	2,6-DINITROTOLUENE	0.524	0.262	0.26
LW12	HMX	CYCLOTETRAMETHYLENE TETRANITR.	0.666	0.333	2.2
LW12	NB	NITROBENZENE	2.41	1.205	0.26
LW12	NG	NITROGLYCERIN	4	2	[1]
LW12	PETN	PETN	4	2	[1]
LW12	RDX	CYCLONITE	0.587	0.2935	1
LW12	TETRYL	NITRAMINE	0.731	0.3655	0.65
BTEX in Soil					
LO02	C6H6	Benzene	0.085	0.0425	2.00
LO02	ETC6H6	Ethylbenzene	0.062	0.031	2.00
LO02	MeC6H6	Toluene	0.028	0.014	2.00
LO02	XYLEN	Xylene	0.086	0.043	2.00
Metals In Water			(µg/L)	(µg/L)	(µg/L)
SB01	HG	MERCURY	0.243	0.1215	0.2
SD09	TL	THALLIUM	0.28	0.14	10
SD20	PB	LEAD	1.26	0.63	3
SD21	SE	SELENIUM	3.02	1.51	5
SD22	AS	ARSENIC	2.54	1.27	10
SS10	AG	SILVER	4.6	2.3	10
SS10	AL	ALUMINUM	141	70.5	200
SS10	BA	BARIUM	5	2.5	200
SS10	BE	BERYLLIUM	5	2.5	5
SS10	CA	CALCIUM	500	250	5000
SS10	CD	CADMIUM	4.01	2.005	5
SS10	CO	COBALT	25	12.5	50
SS10	CR	CHROMIUM	6.02	3.01	10
SS10	CU	COPPER	8.09	4.045	25
SS10	FE	IRON	38.8	19.4	100
SS10	K	POTASSIUM	375	187.5	5000
SS10	MG	MAGNESIUM	500	250	5000
SS10	MN	MANGANESE	2.75	1.375	15
SS10	NA	SODIUM	500	250	5000
SS10	NI	NICKEL	34.3	17.15	40
SS10	SB	ANTIMONY	38	19	860
SS10	V	VANADIUM	11	5.5	50
SS10	ZN	ZINC	21.1	10.55	20
Cyanide in Water					
TF18	CYN	CYANIDE	2.5	1.25	5
Anions in Water					
TF22	NIT	NITRATE/NITRITE	10	5	10
TF27	PO4	TOTAL PHOSPHATES	13.3	6.65	5000
TT10	CL	CHLORIDE	2120	1060	2000
TT10	SO4	SULFATE	10000	5000	5000
TT10	FL	FLUORIDE	1230	615	1000

TABLE 3-1 METHOD AND ANALYTE LIST: FULL LIST

USAEC Method No.	Test Name	Analyte Name	CRL	COD	PQL
Semivolatiles in Water			(µg/L)	(µg/L)	(µg/L)
UM18	124TCB	1,2,4-TRICHLOROBENZENE	1.8	0.9	10
UM18	12DCLB	1,2-DICHLOROBENZENE	1.7	0.85	10
UM18	12DPH	1,2-DIPHENYL HYDRAZINE	[2]		
UM18	13DCLB	1,3-DICHLOROBENZENE	1.7	0.85	10
UM18	14DCLB	1,4-DICHLOROBENZENE	1.7	0.85	10
UM18	245TCP	2,4,5-TRICHLOROPHENOL	5.2	2.6	10
UM18	246TBP	2,4,6-TRIBROMOPHENOL	13	6.5	[1]
UM18	246TCP	2,4,6-TRICHLOROPHENOL	4.2	2.1	10
UM18	24DCLP	2,4-DICHLOROPHENOL	2.9	1.45	10
UM18	24DMPN	2,4-DIMETHYLPHENOL	5.8	2.9	10
UM18	24DNP	2,4-DINITROPHENOL	21	10.5	50
UM18	24DNT	2,4-DINITROTOLUENE	4.5	2.25	10
UM18	26DNT	2,6-DINITROTOLUENE	0.79	0.395	10
UM18	2CLP	2-CHLOROPHENOL	0.99	0.495	10
UM18	2CNAP	2-CHLORONAPHTHALENE	0.5	0.25	10
UM18	2FBP	2-FLUOROBIPHENYL	12	6	sur,[1]
UM18	2FP	2-FLUOROPHENOL	17	8.5	sur,[1]
UM18	2MNAP	2-METHYLNAPHTHLENE	1.7	0.85	10
UM18	2MP	2-METHYLPHENOL	3.9	1.95	10
UM18	2NANIL	2-NITROANILINE	4.3	2.15	50
UM18	2NP	2-NITROPHENOL	3.7	1.85	10
UM18	33DCBD	3,3-DICHLOROBENZIDINE	12	6	20
UM18	3NANIL	3-NITROANILINE	4.9	2.45	50
UM18	46DN2C	2-METHYL-4,6-DINITROPHENOL	17	8.5	50
UM18	4BRPPE	4-BROMOPHENYLPHENYL ETHER	4.2	2.1	10
UM18	4CANIL	4-CHLOROANILINE	7.3	3.65	20
UM18	4CL3C	3-METHYL-4-CHLOROPHENOL	4	2	20
UM18	4CLPPE	4-CHLOROPHENYLPHENYL ETHER	5.1	2.55	10
UM18	4MP	4-METHYLPHENOL	0.52	0.26	10
UM18	4NANIL	4-NITROANILINE	5.2	2.6	20
UM18	4NP	4-NITROPHENOL	12	6	50
UM18	ABHC	BHC, A	[3]		
UM18	AENSLF	ENDOSULFAN A	[3]		
UM18	ALDRN	ALDRIN	[3]		
UM18	ANAPNE	ACENAPHTHENE	1.7	0.85	10
UM18	ANAPYL	ACENAPHTHYLENE	0.5	0.25	10
UM18	ANTRC	ANTHRACENE	0.5	0.25	10
UM18	B2CEXM	BIS(2-CHLOROETHOXY) METHANE	1.5	0.75	10
UM18	B2CIPE	BIS(2-CHLOROISOPROPYL) ETHER	5.3	2.65	10
UM18	B2CLEE	BIS(2-CHLOROETHYL) ETHER	1.9	0.95	10
UM18	B2EHP	BIS(2-EHTYLHEXYL) PHTHALATE	4.8	2.4	10
UM18	BAANTR	BENZO [A] ANTHRACENE	1.6	0.8	10
UM18	BAPYR	BENZO [A] PYRENE	4.7	2.35	10
UM18	BBFANT	BENZO [B] FLUORANTHENE	5.4	2.7	10
UM18	BBHC	BHC, B	[3]		
UM18	BBZP	BUTYLBENZYL PHTHALATE	3.4	1.7	10
UM18	BENSLF	ENDOSULFAN B	[3]		
UM18	BENZID	BENZIDINE	[2]		
UM18	BENZOA	BENZOIC ACID	13	6.5	50
UM18	BGHIPY	BENZO [G,H,I] PERYLENE	6.1	3.05	10
UM18	BKFANT	BENZO [K] FLUORANTHENE	0.87	0.435	10
UM18	BZALC	BENZYL ALCOHOL	0.72	0.36	20
UM18	CHRY	CHRYSENE	2.4	1.2	10
UM18	CL6BZ	HEXACHLOROBENZENE	1.6	0.8	10
UM18	CL6CP	HEXACHLOROCYCLOPENTADIENE	8.6	4.3	10
UM18	CL6ET	HEXACHLOROETHANE	1.5	0.75	10
UM18	CLDANA	CHLORDANE, ALPHA	[3]		
UM18	CLDANG	CHLORDANE, GAMMA	[3]		
UM18	DBAHA	DIBENZ [A,H] ANTHRACENE	6.5	3.25	10
UM18	DBHC	BHC, D	[3]		
UM18	DBZFUR	DIBENZOFURAN	1.7	0.85	10
UM18	DEP	DIETHYL PHTHALATE	2	1	10
UM18	DLDRN	DIELDRIN	[3]		
UM18	DMP	DIMETHYL PHTHALATE	1.5	0.75	10
UM18	DNBP	DI-N-BUTYL PHTHALATE	3.7	1.85	10

TABLE 3-1 METHOD AND ANALYTE LIST: FULL LIST

USAEC Method No.	Test Name	Analyte Name	CRL	COD	PQL
Semivolatiles in Water (continued)			(µg/L)	(µg/L)	(µg/L)
UM18	DNOP	DI-N-OCTYL PHTHALATE	15	7.5	10
UM18	ENDRIN	ENDRIN	[3]		
UM18	ENDRNA	ENDRIN ALDEHYDE	[3]		
UM18	ESFSO4	ENDOSULFAN SULFATE	[3]		
UM18	FANT	FLUORANTHENE	3.3	1.65	10
UM18	FLRENE	FLUORENE	3.7	1.85	10
UM18	GBHC	BHC, G (LINDANE)	[3]		
UM18	HCBD	HEXACHLOROBUTADIENE	3.4	1.7	10
UM18	HPCL	HEPTACHLOR	[3]		
UM18	HPCLE	HEPTACHLOR EPOXIDE	[3]		
UM18	ICDPYR	INDENO [1,2,3-CD] PYRENE	8.6	4.3	10
UM18	ISOPHR	ISOPHORONE	4.8	2.4	10
UM18	KEND	ENDRIN KETONE	[3]		
UM18	MEXCLR	METHOXYCHLOR	[3]		
UM18	NAP	NAPHTHALENE	0.5	0.25	10
UM18	NB	NITROBENZENE	0.5	0.25	10
UM18	NBD5	NITROBENZENE-D5	11	5.5	10
UM18	NNDMEA	N-NITROSODIMETHYLAMINE	[2]		
UM18	NNDNPA	N-NITROSO, DI-N-PROPYLAMINE	4.4	2.2	10
UM18	NNDPA	N-NITROSODIPHENYLAMINE	3	1.5	10
UM18	PCB016	PCB-1016	[3]		
UM18	PCB221	PCB-1221	[3]		
UM18	PCB232	PCB-1232	[3]		
UM18	PCB242	PCB-1242	[3]		
UM18	PCB248	PCB-1248	[3]		
UM18	PCB254	PCB-1254	[3]		
UM18	PCB260	PCB-1260	[3]		
UM18	PCP	PENTACHLOROPHENOL	18	9	50
UM18	PHANTR	PHENANTHRENE	0.5	0.25	10
UM18	PHEND6	PHENOL-D6	36	18	sur,[1]
UM18	PHENOL	PHENOL	9.2	4.6	10
UM18	PPDDD	DDD, PP	[3]		
UM18	PPDDE	DDE, PP	[3]		
UM18	PPDDT	DDT, PP	[3]		
UM18	PYR	PYRENE	2.8	1.4	10
UM18	TRPD14	TERPHEYL-D14	14	7	sur,[1]
UM18	TXPHEN	TOXAPHENE	[3]		
Volatile Organics in Water					
UM20	CCL4	CARBON TETRACHLORIDE	0.58	0.29	5
UM20	C2AVE	VINYL ACETATE	8.3	4.15	50
UM20	MIBK	METHYL ISOBUTYL KETONE	3	1.5	50
UM20	CH3CL	CHLOROMETHANE	3.2	1.6	10
UM20	MNBK	METHYL-N-BUTYL KETONE	3.6	1.8	50
UM20	CHCL3	CHLOROFORM	0.5	0.25	5
UM20	STYR	STYRENE	0.5	0.25	5
UM20	DBRCLM	DIBROMOCHLOROMETHANE	0.67	0.335	5
UM20	CL2BC	DICHLOROBENZENE (TOTAL)	[2]		
UM20	CH2CL2	METHYLENE CHLORIDE	2.3	1.15	5
UM20	ACROLN	ACROLEIN	[2]		
UM20	MEC6H5	TOLUENE	0.5	0.25	5
UM20	111TCE	1,1,1-TRICHLOROETHANE	0.5	0.25	5
UM20	TCLEA	1,1,2,2-TETRACHLOROETHANE	0.51	0.255	5
UM20	112TCE	1,1,2-TRICHLOROETHANE	1.2	0.6	5
UM20	TRCLE	TRICHLOROETHENE	0.5	0.25	5
UM20	11DCE	1,1-DICHLOROETHENE	0.5	0.25	5
UM20	ACET	ACETONE	13	6.5	100
UM20	11DCLE	1,1-DICHLOROETHANE	0.68	0.34	5
UM20	12DCE	1,2-DICHLOROETHENE (TOTAL)	0.5	0.25	5
UM20	12DCLE	1,2-DICHLOROETHANE	0.5	0.25	5
UM20	ACRYLO	ACRYLONITRILE	[2]		
UM20	12DCLP	1,2-DICHLOROPROPANE	0.5	0.25	5
UM20	CLC6H5	CHLOROBENZENE	0.5	0.25	5
UM20	2CLEVE	2-CHLOROETHYLVINYL ETHER	0.71	0.355	10
UM20	ETC6H5	ETHYLBENZENE	0.05	0.25	5

TABLE 3-1 METHOD AND ANALYTE LIST: FULL LIST

USAEC Method No.	Test Name	Analyte Name	CRL	COD	PQL
Volatile Organics in Water (continued)			(µg/L)	(µg/L)	(µg/L)
UM20	BRDCLM	BROMODICHLOROMETHANE	0.59	0.295	5
UM20	TCLEE	TETRACHLOROETHENE	1.6	0.8	5
UM20	C13DCP	CIS-1,3-DICHLOROPROPENE	0.58	0.29	5
UM20	CS2	CARBON DISULFIDE	0.5	0.25	100
UM20	C2H3CL	VINYL CHLORIDE	2.6	1.3	10
UM20	CHBR3	BROMOFORM	2.6	1.3	5
UM20	C2H5CL	CHLOROETHANE	1.9	0.95	10
UM20	T13DCP	TRANS-1,3-DICHLOROPROPENE	0.7	0.35	5
UM20	C6H6	BENZENE	0.5	0.25	5
UM20	MEK	METHYL ETHYL KETONE	6.4	3.2	100
UM20	XYLEN	XYLENES (TOTAL)	0.84	0.42	5
UM20	CH3BR	BROMOMETHANE	5.8	2.9	10
UM20	CCL3F	TRICHLOROFLUOROMETHANE	1.4	0.7	[1]
Explosives in Water					
UW32	13DNB	1,3-DINITROBENZENE	0.611	0.3055	0.11
UW32	TETRYL	NITRAMINE	2.489	1.2445	**4.0
UW32	HMX	CYCLOTETRAMETHYLENE TETRANITR.	1.21	0.605	**13.0
UW32	246TNT	2,4,6-TRINITROTOLUENE	0.635	0.3175	0.11
UW32	135TNB	1,3,5-TRINITROBENZENE	0.449	0.2245	0.26
UW32	26DNT	2,6-DINITROTOLUENE	0.0738	0.0369	0.31
UW32	NB	NITROBENZENE	0.645	0.3225	**6.4
UW32	24DNT	2,4-DINITROTOLUENE	0.0637	0.03185	0.02
UW32	RDX	CYCLONITE	1.17	0.585	0.84
UW32	2NT	2-NITROTOLUENE	0.406	0.203	**12.0
PCB's in Water					
UHO2	PCB016	Aroclor-1016	0.16	0.08	[2]
UHO2	PCB221	Aroclor-1221	[1]		[2]
UHO2	PCB232	Aroclor-1232	[1]		[2]
UHO2	PCB242	Aroclor-1242	[1]		0.65
UHO2	PCB248	Aroclor-1248	[1]		[2]
UHO2	PCB254	Aroclor-1254	[1]		[2]
UHO2	PCB260	Aroclor-1260	0.19	0.095	[2]
Organochloropesticides in Water					
UH13		ALDRIN	0.0918	0.0459	0.04
UH13		BHC,A	0.0385	0.01925	0.03
UH13		BHC,B	0.024	0.012	0.06
UH13		BHC,D	0.0293	0.01465	0.09
UH13		BHC,G (LINDANE)	0.0507	0.02535	0.04
UH13		CHLORDANE, TECH	0.265	0.1325	0.14
UH13		DDD,PP'	0.0233	0.01165	0.11
UH13		DDE,PP'	0.027	0.0135	0.04
UH13		DDT,PP'	0.034	0.017	0.12
UH13		DIELDRIN	0.0240	0.012	0.02
UH13		ENDOSULFAN SULFATE	0.0786	0.0393	0.66
UH13		ENDOSULFAN,A	0.0230	0.0115	0.14
UH13		ENDOSULFAN,B	0.023	0.0115	0.04
UH13		ENDRIN	0.0238	0.0119	0.06
UH13		ENDRIN ALDEHYDE	0.0285	0.01425	0.23
UH13		ENDRIN KETONE	[2]		
UH13		HEPTACHLOR	0.0423	0.02115	0.03
UH13		HEPTACHLOR EPOXIDE	0.0245	0.01225	0.83
UH13		ISODRIN	0.0562	0.0281	[1]
UH13		METHOXYCHLOR	0.057	0.0285	1.76
UH13		TOXAPHENE	1.350	0.675	2.4

** HIGH LEVEL VALUES AS STATED IN SW 846 METHOD 8330
[1] Value or analyte not found in SW846 Method Analyte List
[2] Value or analyte not found in USAEC Method Analyte List, compound may be reported as a Tentatively Identified Compound (TIC) if Mass Spectroscopy is performed.
[3] CRL not included with this USAEC Method. The analyte and CRL has been included with the appropriate primary method with lower detection limits.
sur = surrogate

3.0.0.3 Table 3-2 presents a subset of the analytes from Table 3-1. These analytes have a CRL greater than or equal to the SW-846 PQL. The majority of the analytes were eliminated from Table 3-1 due to a CRL below the PQL and will be reported using normal USAEC reporting methods (as suggested in item (1) of the USAEC guidance) and will not be included in the remaining evaluation. In addition, analytes have also been omitted from Table 3-2 due to lack of information for certain USAEC-method and SW-846-method compounds (i.e. no detection limits were available for comparison). As an example, organochlorine pesticides, polychorinated biphenyls (PCBs), and explosives have been added to the USAEC LM18 and USAEC UM18 methods (semivolatile organic compounds in soil and water) but are not in the equivalent SW-846 method, EPA 8270.

3.0.0.4 Analytes which have a COD less than the PQL have been eliminated and these analytes will be reported using the flagging code "1" (as suggested in item (2) of the USAEC guidance). These analytes are listed below.

SOIL	METHOD	TEST NAME	ANALYTE NAME
	JB01	HG	MERCURY
	JS16	CR	CHROMIUM
		ZN	ZINC
	LH10	CLDAN	CHLORADANE
		ENDRINA	ENDRIN ALDEHYDE
		PPDDD	DDD,PP'
	LM18	24DNP	2,4-DINITROPHENOL

SOIL	METHOD	TEST NAME	ANALYTE NAME
	LW12	135TNB	1,3,5-TRINITROBENZENE
		13DNB	1,3-DINITROBENZENE
		24DNT	2,4-DINITROTOLUENE
		26DNT	2,6-DINITROTOLUENE
		246TNT	2,4,6-TRINITROTOLUENE
		TETRYL	NITRAMINE
	LM19	112TCE	1,1,2-TRICHLOROETHANE
		CHBR3	BROMOFORM
		CCL4	CARBON TETRACHLORIDE
WATER	SB01	HG	MERCURY
	SS10	ZN	ZINC
	UH13	ABHC	BHC,A
		ALDRN	ALDRIN
		DLDRN	DIELDRIN
		HPCL	HEPTACHLOR
		LIN	LINDANE
	UM18	DNOP	DI-N-OCTYLPHTHALATE
	UW32	135TNB	1,3,5-TRINITROBENZENE
		RDX	CYCLONITE
	TT10	CL	CHLORIDE
		SO4	SULFATE
		FL	FLUORIDE

3.0.0.5 Table 3.3 presents analytes that have a COD greater than the SW-846 PQL. The analytes which have a COD greater than the SW-846 PQL must be addressed by the

TABLE 3-2 METHOD AND ANALYTE LIST: ANALYTES WHERE CRL>PQL

USAEC Method No.	Test Name	Analyte Name	CRL	COD	PQL
Metals in Soil			(ug/g)	(ug/g)	(ug/g)
JB01	HG	MERCURY	0.05	0.025	0.04
JS16	CR	CHROMIUM	4.05	2.025	2
JS16	TL	THALLIUM	6.62	3.31	2
JS16	PB	LEAD	10.5	5.25	0.6
JS16	ZN	ZINC	8.03	4.015	4
Organochlorine Pesticides in Soil					
LH10	ABHC	BHC,A	0.00907	0.004535	0.00201
LH10	ALDRN	ALDRIN	0.00729	0.003645	0.00268
LH10	BENSLF	ENDOSULFAN,B	0.00663	0.003315	0.00268
LH10	CLDAN	CHLORDANE	0.0177	0.00885	0.00938
LH10	DLDRN	DIELDRIN	0.00629	0.003145	0.00134
LH10	ENDRNA	ENDRIN ALDEHYDE	0.024	0.012	0.01541
LH10	HPCL	HEPTACHLOR	0.00618	0.00309	0.00201
LH10	LIN	BHC,G	0.00638	0.00319	0.00268
LH10	PPDDD	DDD,PP'	0.00826	0.00413	0.00737
LH10	PPDDE	DDE,PP'	0.00765	0.003825	0.00268
LH10	TXPHEN	TOXAPHENE	0.444	0.222	0.13668
Semivolatiles in Soil					
LM18	24DMPN	2,4-DIMETHYLPHENOL	0.69	0.345	0.66
LM18	33DCBD	3,3-DICHLOROBENZIDINE	6.3	3.15	1.3
LM18	CL6CP	HEXACHLOROCYCLOPENTADIENE	6.2	3.1	0.66
Volatile Organics in Soil					
LM19	112TCE	1,1,2-TRICHLOROETHANE	0.0054	0.0027	0.005
LM19	CHBR3	BROMOFORM	0.0069	0.00345	0.005
LM19	CCL4	CARBON TETRACHLORIDE	0.007	0.0035	0.005
LM19	CH2CL2	METHYLENE CHLORIDE	0.012	0.006	0.005
Explosives in Soil					
LW12	135TNB	1,3,5-TRINITROBENZENE	0.488	0.244	0.25
LW12	13DNB	1,3-DINITROBENZENE	0.496	0.248	0.25
LW12	246TNT	2,4,6-TRINITROTOLUENE	0.456	0.228	0.25
LW12	24DNT	2,4-DINITRITOLUENE	0.424	0.212	0.25
LW12	26DNT	2,6-DINITROTOLUENE	0.524	0.262	0.26
LW12	NB	NITROBENZENE	2.41	1.205	0.26
LW12	TETRYL	NITRAMINE	0.731	0.3655	0.65

TABLE 3-2 METHOD AND ANALYTE LIST: ANALYTES WHERE CRL>PQL

USAEC Method No.	Test Name	Analyte Name	CRL	COD	PQ
Metals in Water			(µg/L)	(µg/L)	(µg/L)
SS10	ZN	ZINC	21.1	10.55	20
SB01	HG	MERCURY	0.243	0.1215	0.2
Organochlorpesticides in Water					
UH13	ABHC	BHC, A	0.0385	0.01925	0.03
UH13	ALDRN	ALDRIN	0.0918	0.0459	0.04
UH13	CLDAN, T	CHLORDANE	0.265	0.1325	0.014
UH13	DLDRN	DIELDRIN	0.0240	0.012	0.02
UH13	HPCL	HEPTACHLOR	0.0423	0.02115	0.03
UH13	LIN	LINDANE	0.0507	0.02535	0.04
Semivolatiles in Water					
UM18	DNOP	DI-N-OCTYL PHTHALATE	15	7.5	10
Explosives in Water					
UW32	13DNB	1,3-DINITROBENZENE	0.611	0.3055	0.1
UW32	246TNT	2,4,6-TRINITROTOLUENE	0.635	0.3175	0.1
UW32	135TNB	1,3,5-TRINITROBENZENE	0.449	0.2245	0.26
UW32	24DNT	2,4-DINITROTOLUENE	0.0637	0.03185	0.02
UW32	RDX	CYCLONITE	1.17	0.585	0.84
ANIONS IN WATER					
TT10	CL	CHLORIDE	2120	1060	2000
TT10	SO4	SULFATE	10000	5000	5000
TT10	FL	FLUORIDE	1230	615	1000

TABLE 3–3 METHOD AND ANALYTE LIST: ANALYTES WHERE COD>PQL

USAEC Method No.	Test Name	Analyte Name	CRL	COD	PQL
Metals in Soil			(ug/g)	(ug/g)	(ug/g)
JS16	TL	THALLIUM	6.62	3.31	2
JS16	CR	CHROMIUM	4.05	2.03	2
JS16	PB	LEAD	10.5	5.25	0.6
JS16	ZN	ZINC	8.03	4.02	4
Organochlorine Pesticides in Soil					
LH10	ABHC	BHC,A	0.00907	0.004535	0.00201
LH10	ALDRN	ALDRIN	0.00729	0.003645	0.00268
LH10	BENSLF	ENDOSULFAN,B	0.00663	0.003315	0.00268
LH10	DLDRN	DIELDRIN	0.00629	0.003145	0.00134
LH10	HPCL	HEPTACHLOR	0.00618	0.00309	0.00201
LH10	LIN	BHC,G	0.00638	0.00319	0.00268
LH10	PPDDE	DDE,PP'	0.00765	0.003825	0.00268
LH10	TXPHEN	TOXAPHENE	0.444	0.222	0.13668
Semivolatiles in Soil					
LM18	33DCBD	3,3–DICHLOROBENZIDINE	6.3	3.15	1.3
LM18	CL6CP	HEXACHLOROCYCLOPENTADIENE	6.2	3.1	0.66
Volatile Organics in Soil					
LM19	CH2CL2	METHYLENE CHLORIDE	0.012	0.006	0.005
Explosives in Soil					
LW12	NB	NITROBENZENE	2.41	1.205	0.26
LW12	26DNT	2,6–DINITROTOLUENE	0.524	0.262	0.26
Organochlorpesticides in Water			(ug/L)	(ug/L)	(ug/L)
UH13	ALDRN	ALDRIN	0.0918	0.0459	0.04
Explosives in Water					
UW32	13DNB	1,3–DINITROBENZENE	0.611	0.3055	0.11
UW32	246TNT	2,4,6–TRINITROTOLUENE	0.635	0.3175	0.11
UW32	24DNT	2,4–DINITROTOLUENE	0.0637	0.03185	0.02

spiking program referred to in item (3) of the USAEC guidance. The details of the spiking program are included in item (4) of this same guidance in order to demonstrate ESE's ability to report "real" concentrations (i.e., no false positives or false negatives).

3.0.0.6 The results of the USAEC recommended spiking program (historical) are presented in Table 3-4. Many compounds listed in Table 3-3 were spiked at or below the respective SW-846 PQL during the USAEC certification process. Based on results of the certification spiking program, the following analytes have shown acceptable recovery from the spiked samples and minimal or no recovery from the blanks.

SOIL	METHOD	TEST NAME	ANALYTE NAME
	LH10	ABHC	BHC,A
		ALDRN	ALDRIN
		BENSLF	ENDOSULFAN,B
		DLDRN	DIELDRIN
		HPLC	HEPTACHLOR
		LIN	BHC,G
		PPDDE	DDE,PP'
		TXPHEN	TOXAPHENE
	LM19	MECL2	METHYLENE CHLORIDE
WATER	UH13	ALDRN	ALDRIN

ESE believes that the analytical results for the compounds listed above can be accurately reported to SW-846 PQLs.

TABLE 3–4 METHOD SPIKE RECOVERIES: HISTORICAL SPIKING DATA

USAEC Method No.	Test Name	SW 846 PQL (ug/g)	SPIKE TARGET (ug/g)	RECOVERY (ug/g)	BLANK RECOVERY (ug/g)
Organochlorine Pesticides in Soil					
LH10	ABHC	0.00201	0.00135	0.00164	0.00024
LH10	ALDRN	0.00268	0.00128	0.00165	0.0
LH10	BENSLF	0.00268	0.00122	0.00135	0.00005
LH10	DLDRN	0.00134	0.00127	0.00148	0.0
LH10	HPCL	0.00201	0.00131	0.00153	0.000065
LH10	LIN	0.00268	0.00131	0.00159	0.000208
LH10	PPDDE	0.00268	0.00143	0.00168	0.000045
LH10	TXPHEN	0.1608	0.112	0.175	0.0
Semivolatiles in Soil					
LM18	33DCBD	1.3	1.33	0.0	0.0
LM18	CL6CP	0.66	1.33	0.108	0.0
Volatile Organics in Soil					
LM19	CH2CL2	0.005	0.005	0.010	0.00245
Explosives in Soil					
LW12	26DNT	0.260	0.524	0.568	0.04
LW12	NB	0.26	0.548	0.373	0.09
Organochlorpesticides in Water		(ug/L)	(ug/L)	(ug/L)	(ug/L)
UH13	ALDRN	0.0400	0.0243	0.0419	0.0
Explosives in Water					
UW32	13DNB	0.11	0.1375	0.06181	0.0
UW32	246TNT	0.11	0.28	0.5368	0.0
UW32	24DNT	0.02	0.053	0.0428	0.0

3.0.0.7 Table 3-5 presents the analytes and compounds that neither meet the reporting requirements in the USAEC guidance (items (1) and (2)) nor have acceptable spiking recoveries as described in the USAEC guidance (items (3) and (4)). These analytes and compounds require either further discussion or additional spike recovery evaluation to meet the USAEC guidance requirements.

3.0.0.8 Tables 3-6a thru 3-6d present the spiking information for the compounds found in Table 3-5 and the recommendations for analytes which ESE had not previously spiked at the appropriate levels. Of the compounds listed in Table 3-5, ESE has failed to demonstrate its ability to report only the thallium, lead, hexachlorocyclopentadiene and 3,3-dichlorobenzidine in soil to the SW-846 PQL as presented above.

4.0 SUMMARY

4.0.0.1 As this report details, no analytes or compounds will be reported below the SW-846 PQL unless the established CRL is already less than the SW-846 PQL. Analytes and compounds that have detectable concentrations between the COD and SW-846 PQL will be reported to the IRDMIS with a "1" flag. Analytes and compounds that do not fit into either of these two categories will be submitted separately in hard copy format to the client and USAEC. Compounds that do not have detectable concentrations but are in the second category (COD is less than SW-846 PQL) will be reported to the IRDMIS using the CRL as detection limit. The evidence that the concentration was determined to be either less than or equal to the SW-846 PQL will be maintained by the laboratory and available for review if requested.

TABLE 3-5 ANALYTES WHICH REQUIRE ADDITIONAL ATTENTION/EXPLANATION

USAEC Method No.	Test Name	Analyte Name
Metals in Soil		
JS16	TL	THALLIUM
JS16	CR	CHROMIUM
JS16	PB	LEAD
JS16	ZN	ZINC
Semivolatiles in Soil		
LM18	33DCBD	3,3-DICHLOROBENZIDINE
LM18	CL6CP	HEXACHLOROCYCLOPENTADIENE
Explosives in Soil		
LW12	NB	NITROBENZENE
LW12	26DNT	2,6-DINITROTOLUENE
Explosives in Water		
UW32	13DNB	1,3-DINITROBENZENE
UW32	246TNT	2,4,6-TRINITROTOLUENE
UW32	24DNT	2,4-DINITROTOLUENE

Table 3-6a

Method: LM18
Analytes: CL6CP, 33DCBD
Matrix: Soil and Water
Units: ug/g (soil); ug/L (water)

Discussion:
As described previously (Table 3-4), ESE has spiked soil samples with concentrations of these analytes at or near the estimated PQLs given by SW-846. Poor recoveries were obtained at these extremely low levels in soil. ESE has demonstrated excellent recoveries from aqueous samples indicating instrument sensitivities for the analytes in question. The problem, however, is the extraction of these compounds from the soil matrix. ESE believes, and has demonstrated, that the recoveries from USAEC, uncleaned standard soil,* is not possible at the SW-846 PQL.

	Soil			Water	
Analyte	Target	Recovery	Analyte	Target	Recovery
CL6CP	0	0	CL6CP	0	0
		0			0
	1.33	0		2	0.91
		0.0215			0.94
	13.3	1.8715		20	10.73
		1.505			11.97
33DCBD	0	0	33DCBD	0	0
		0			0
	1.33	0		2	1.11
		0			0.82
	13.3	8.881		20	21.19
		7.632			27.96

*ESE has been requested to use uncleaned USAEC Standard Soil (Appendix II).

Table 3-6b
Method: UW32
Analytes: 2,4,6-TNT; 2,4-DNT; 1,3DNB
Matrix: Water
Units: ug/L

Discussion:

As described previously (Table 3-4), ESE has spiked these compounds above the PQL with excellent recoveries. ESE will spike these compounds at the PQL and report the results as instructed by USAEC. It should be noted, however, that the "salting out" procedure utilized by the SW-846 method and not performed with the standard AEC methodology may provide the additional steps necessary to achieve the estimated PQL given in SW-846 method 8330.

Analyte	Target	Recovery
2,4,6-TNT	0	0.0
	0.11	0.121
2,4-DNT	0	0.0
	0.022	0.038
1,3-DNB	0	0.0
	0.11	0.129

As shown in the results above ESE has demonstrated the ability to acheive the SW-846 PQL using the USAEC Method UW32.

Table 3-6c

Method: LW12
Analytes: NB, 26DNT
Matrix: Soil
Units: ug/L

Discussion:

As shown in Table 3-4, ESE has spiked NB at nearly two times the estimated PQL in SW846 method 8330 with excellent recoveries when compared to the blank spike. ESE will spike for recovery of NB from soil at the estimated PQL. ESE believes, however, that recoveries at the estimated PQL may not be achievable due to slight differences in the methods (USAEC method LW12 vs. SW-846 method 8080) which should produce lower detection limits for method 8330. These include differences in the initial sample weight and final volume of the extract, along with the use of $CaCl_2$ solution in method 8330.
26DNT can be eliminated from spiking due to equivalent detection limits when the USAEC COD is rounded for comparison to the SW-846 PQL.

Results:

Analyte	Target	Recovery
NB	0	0
	0.258	0.250

As shown above the results demonstrate ESE's ability to acheive the SW-846 PQLs for nitrobenzene using USAEC Method LW12.

Table 3-6d

Method: JS16
Analyte: Tl, Cr, Pb, Zn
Matrix: Soil
UNITS: ug/g

Discussion:

As described earlier the thallium level achievable with ICP (JS16) is insufficient to meet EPA's CLP levels. The level which is achievable by ICP is only slightly higher than the desired level 3.31 (COD) vs. 2.0 (PQL). To achieve levels below the COD, GFAA must be employed.

For lead the detection limit described by EPAs CLP (0.6) is also much lower than is attainable by the USAEC JS16 Method (5.25). GFAA must be employed to meet the desired detection limit.

Chromium and zinc levels, when rounded for comparison to the PQL level are identical. The USAEC method JS16 can be employed to achieve the desired levels.

APPENDIX I

MKECK: HADDOX.LTR

October 5, 1993

Installation Restoration Division

TRD

RLC
IR-S

MK/ TMG
RO

TSC

Mr. Charley Haddox
EBASCO Services, Inc.
143 Union Boulevard
Suite 1010
Lakewood, Colorado 80228

Dear Mr. Haddox:

This letter is to follow up on the telephone conversation between you and Mr. Michael Eck on September 27, 1993 regarding detection limits for reporting analytical data results for the Tooele Army Depot (TEAD)-South Area Group 2 Suspected Releases Units Phase II RCRA Facility Investigation (RFI).

The state of Utah requires the reporting of all analytical values greater than the U.S. Environmental Protection Agency (EPA) SW 846 practical quantitation limits (PQLs). For some analytes, the U.S. Army Environmental Center-approved method certified reporting level (CRL) is greater than the PQL. Follow the appropriate procedure below to report values greater than the PQL but less than the CRL.

1. If half the CRL is less than or equal to the PQL, values greater than the PQL and less than the CRL can be entered into the Installation Restoration Data Management Information System (IRDMIS) database with the flagging codes J and P. Use normal IRDMIS data validation procedures.

2. If half the CRL is greater than the PQL, values greater than the PQL and less than half the CRL cannot be entered into the IRDMIS database. Your laboratory must transmit to EBASCO all values greater than the PQL and less than half the CRL in hard-copy format for inclusion in the draft and final RFI reports. Because IRDMIS data validation procedures cannot be used, EBASCO must validate the data. After the completion of all laboratory analysis, provide this Center with a letter certifying that all data excluded from IRDMIS data validation have been checked for errors using accepted procedures. To ensure that the numbers ~~reported by the lab~~ which are less than half the CRL are accurate, your lab must demonstrate their accuracy at these low levels. The following process should be followed:

a. Prepare four standard matrix samples, two blank and two spiked, with the compound at the PQL.

b. Process to show that the method can distinguish between the samples such that there are no false positives or negatives.

c. Report the numbers with your interpretation to this Center.

Since the field program was scheduled to start on October 4, 1993, this demonstration effort should be done immediately. Please notify this Center if the lab's demonstration fails for any of the tested compounds.

Please include this comment in your revision of the Data Collection Quality Assurance Plan following receipt of all comments. The draft and final RFI reports must include all detected values greater than the PQLs.

The point of contact for this action is Mr. Michael Eck, (410) 671-1636. The point of contact for IRDMIS or chemistry questions is Mr. Doug Scarborough, (410) 671-1567.

Sincerely,

Mary Ellen Heppner
Contracting Officers
Representative

Copy Furnished:

Mr. Barry Woods, 104 Colonial Drive, Vicksburg, Mississippi 39180

DEPARTMENT OF THE ARMY

US ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY

ABERDEEN PROVING GROUND, MARYLAND 21010-5401

REPLY TO ATTENTION OF

October 20, 1992

Technical Support Division

Sent to:
Dr. Sim Lessley, DataChem Laboratories
Mr. Hugh Prentice, ESE (Gainesville)
Mr. Kenneth Dahlan, ESE (Denver)
Ms. Deborah Racioppi, Roy F. Weston, Inc.
Dr. William Scruton, PACE, Incorporated
Mr. Thomas Johnson, Interpoll Laboratories
Mr. Charles Fell, ETC Corporation
Ms. Mimi Uhlfelder, EA Laboratories

Dear USATHAMA Laboratory:

This is to inform you of several modifications to current U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) procedures. These modifications are not perceived as having any cost impact on efforts being conducted under the Total Environmental Program Support contract.

This Agency is implementing the use of a replacement standard soil, lot number R2D, for all USATHAMA projects. Use of the current standard soil (green in color) should be discontinued upon receipt of the replacement soil.

The R2D soil will be used in its natural state, **unwashed**, in the quantities specified in the approved USATHAMA method, with the exception of metals by inductively coupled plasma (ICP).

Metals by ICP will use 0.1 gram of the R2D soil, **unwashed**. The following analytes will **NOT** be control analytes due to continued high background concentrations, even with the lesser quantity of standard soil: Al, Ba, Ca, Fe, K, Mg, Mn, and Na. All other analytes run by the ICP method **WILL** be control analytes. Therefore, any result reported for a metal by ICP, not included in the list above, **MUST** have control charts to support the data.

For example, if the only metal analyses requested include Mg, Ba, Se, and Cr, then control charts are produced for Se and Cr. Analytes Mg and Ba would not require control charts. All other analytes would be required to be spiked into the quality control (QC) samples, but not analyzed for and/or reported.

Method blank correction to the QC samples is required whenever an analyte is detected above the instrument detection level in the method blank. The correction will be done based upon instrument response values and not the found values calculated off a calibration curve. If the instrument response output is only in concentration, then the correction will be

based on that value, as long as it is above the instrument detection level, as determined in accordance with the U.S. Environmental Protection Agency guidance. Only QC samples will be method blank corrected. Under no circumstances will actual sample results be corrected for the method blank values.

Due to erratic recoveries of antimony by ICP, USATHAMA recommends dropping the analysis of antimony from this method. Laboratories should consider the analysis of antimony by graphite furnace atomic absorption spectrometry.

Should your laboratory not have R2D soil currently, contact Ms. Darlene F. Bader, (410) 671-1573/3348. Other questions should be directed to your USATHAMA project chemist.

Sincerely,

Dennis J. Wynne
Chief
Technical Support Division

Copy Furnished:

Program Manager for Rocky Mountain Arsenal, Attention: AMXRM-LS (Messrs. Gregory Mohrman and Douglas Stevenson), Commerce City, Colorado 80022-2180
ALL TEPS PRIMES ✓

Richard

NOTES OF TELEPHONE CONVERSATION

ESE Personnel making (or receiving) call: O'Brien

To (or from): Doug Scarborough

of: US AEC

Telephone Number:

Time and Date: 1030 2/18/94

Subject of Conversation: Flagging Code for hits > COD, but < CRL

Project Number: TS, TN ~~7~~9340726 0200

COMMENTS:

For the hits below the CRL but greater than the COD, use Flagging Code "1" (one) not J & P for the "older" (pre 1993 QA plan) methods.

ESE Environmental Science & Engineering, Inc.

APPENDIX II

TABLE 1
ESTIMATED QUANTITATION LIMITS

Compounds	Water (µg/L) Low-Level	Water (µg/L) High-Level	Soil (mg/kg)
HMX	-	13.0	2.2
RDX	0.84	14.0	1.0
1,3,5-TNB	0.26	7.3	0.25
1,3-DNB	0.11	4.0	0.25
Tetryl	-	4.0	0.65
NB	-	6.4	0.26
2,4,6-TNT	0.11	6.9	0.25
4-Am-DNT	0.060	-	-
2-Am-DNT	0.035	-	-
2,6-DNT	0.31	9.4	0.26
2,4-DNT	0.020	5.7	0.25
2-NT	-	12.0	0.25
4-NT	-	8.5	0.25
3-NT	-	7.9	0.25

TABLE 2. PRACTICAL QUANTITATION LIMITS (PQL) FOR VOLATILE ORGANICS[a]

Volatiles	CAS Number	Practical Quantitation Limits[b] Ground water ug/L	Low Soil/Sediment ug/Kg
1. Chloromethane	74-87-3	10	10
2. Bromomethane	74-83-9	10	10
3. Vinyl Chloride	75-01-4	10	10
4. Chloroethane	75-00-3	10	10
5. Methylene Chloride	75-09-2	5	5
6. Acetone	67-64-1	100	100
7. Carbon Disulfide	75-15-0	5	5
8. 1,1-Dichloroethene	75-35-4	5	5
9. 1,1-Dichloroethane	75-35-3	5	5
10. trans-1,2-Dichloroethene	156-60-5	5	5
11. Chloroform	67-66-3	5	5
12. 1,2-Dichloroethane	107-06-2	5	5
13. 2-Butanone	78-93-3	100	100
14. 1,1,1-Trichloroethane	71-55-6	5	5
15. Carbon Tetrachloride	56-23-5	5	5
16. Vinyl Acetate	108-05-4	50	50
17. Bromodichloromethane	75-27-4	5	5
18. 1,1,2,2-Tetrachloroethane	79-34-5	5	5
19. 1,2-Dichloropropane	78-87-5	5	5
20. trans-1,3-Dichloropropene	10061-02-6	5	5
21. Trichloroethene	79-01-6	5	5
22. Dibromochloromethane	124-48-1	5	5
23. 1,1,2-Trichloroethane	79-00-5	5	5
24. Benzene	71-43-2	5	5
25. cis-1,3-Dichloropropene	10061-01-5	5	5
26. 2-Chloroethyl Vinyl Ether	110-75-8	10	10
27. Bromoform	75-25-2	5	5
28. 2-Hexanone	591-78-6	50	50
29. 4-Methyl-2-pentanone	108-10-1	50	50
30. Tetrachloroethene	127-18-4	5	5

TABLE 2. - Continued

Volatiles	CAS Number	Practical Quantitation Limits[b] Ground water ug/L	Low Soil/Sediment ug/Kg
31. Toluene	108-88-3	5	5
32. Chlorobenzene	108-90-7	5	5
33. Ethyl Benzene	100-41-4	5	5
34. Styrene	100-42-5	5	5
35. Total Xylenes		5	5

[a]Sample PQLs are highly matrix-dependent. The PQLs listed herein are provided for guidance and may not always be achieveable. See the following information for further guidance on matrix-dependent PQLs.

[b]PQLs listed for soil/sediment are based on wet weight. Normally data is reported on a dry weight basis; therefore, PQLs will be higher, based on the % moisture in each sample.

Other Matrices:	Factor[1]
Water miscible liquid waste	50
High-level soil & sludges	125
Non-water miscible waste	500

[1]PQL = [PQL for ground water (Table 2)] X [Factor]. For non-aqueous samples, the factor is on a wet-weight basis.

APPENDIX III

CERTIFICATION ANALYSIS

Report Date: 09/19/88

Method Name: ABHC
Compound: ABHC
Units of Measure: ~~UGG~~ ug/kg

Laboratory: ES
Analysis Date: 08/16/88
Matrix: SO

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0.2600000
	0.2000000
	0.2200000
	0.2800000
1.3500000	1.5800000
	2.0500000
	1.4200000
	1.5100000
2.7000000	2.1700000
	2.9300000
	9.8000000
	3.4400000
5.4000000	4.6700000
	5.5700000
	6.4100000
	4.5900000
13.510000	11.860000
	12.030000
	15.920000
	6.8000000
27.020000	24.530000
	23.060000
	28.410000
	27.980000

CERTIFICATION ANALYSIS

Report Date: 09/19/88

Method Name: ALDRN
Compound: ALDRN
Units of Measure: ~~UGG~~ ug/Kg

Laboratory: ES
Analysis Date: 08/16/88
Matrix: SO

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0
	0
	0
	0
1.2800000	0.6200000
	3.9000000
	0.7700000
	1.2900000
2.5700000	2.0600000
	2.6900000
	5.0300000
	3.0600000
5.1400000	5.7100000
	5.5200000
	7.3700000
	5.0500000
12.850000	11.460000
	12.910000
	16.230000
	7.2400000
25.700000	24.840000
	22.450000
	28.430000
	28.580000

CERTIFICATION ANALYSIS

Report Date: 09/19/88

Method Name: BENSLF
Compound: BENSLF
Units of Measure: ~~UGG~~ ug/Kg

Laboratory: ES
Analysis Date: 08/16/88
Matrix: SO

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0
	0
	0.1600000
	0.0400000
1.2200000	1.3400000
	1.8300000
	0.7600000
	1.4800000
2.4400000	2.4200000
	3.0200000
	2.8500000
	5.2800000
4.8700000	6.1400000
	7.1400000
	6.4800000
	5.0500000
12.190000	11.890000
	13.260000
	17.060000
	7.4100000
24.370000	24.640000
	24.700000
	29.890000
	30.610000

CERTIFICATION ANALYSIS

Report Date: 09/19/88

Method Name: DLDRN
Compound: DLDRN
Units of Measure: ~~UGG~~ ug/kg

Laboratory: ES
Analysis Date: 08/16
Matrix: SO

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0
	0
	0
	0
1.2700000	1.5100000
	2.1900000
	0.8900000
	1.3600000
2.5400000	2.6100000
	2.9500000
	2.9100000
	4.6900000
5.0900000	7.3100000
	5.9800000
	6.8600000
	5.3700000
12.720000	12.750000
	13.380000
	17.290000
	7.9800000
25.430000	24.770000
	24.080000
	29.430000
	29.610000

CERTIFICATION ANALYSIS

Report Date: 09/19/88

Method Name: HPLC
Compound: HPLC
Units of Measure: UGG ug/kg

Laboratory: ES
Analysis Date: 08/16/88
Matrix: SO

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0.2300000
	0
	0
	0.0300000
1.3100000	1.3500000
	1.7800000
	1.0800000
	1.9100000
2.6200000	2.5900000
	2.8700000
	2.3800000
	3.6800000
5.2500000	7.1400000
	5.6100000
	5.6800000
	6.6900000
13.110000	13.950000
	12.720000
	17.860000
	8.2900000
26.230000	26.190000
	24.820000
	30.210000
	29.310000

CERTIFICATION ANALYSIS

Report Date: 09/19/88

Method Name: LIN
Compound: LIN
Units of Measure: ~~UGG~~ ug/Kg

Laboratory: ES
Analysis Date: 08/16
Matrix: SO

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0.2300000
	0.1800000
	0.1800000
	0.2400000
1.3100000	1.6700000
	1.4900000
	1.4700000
	1.7400000
2.6200000	2.7700000
	3.5800000
	3.1100000
	3.7200000
5.2500000	7.2400000
	7.0100000
	5.9000000
	5.9900000
13.110000	13.610000
	12.050000
	18.670000
	8.6300000
26.230000	26.510000
	25
	28.750000
	30.210000

CERTIFICATION ANALYSIS

Report Date: 09/19/88

Method Name: PPDDE
Compound: PPDDE
Units of Measure: ~~UGG~~ ug/Kg

Laboratory: ES
Analysis Date: 08/16/88
Matrix: SO

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0.0100000
	0
	0.1700000
	0
1.4300000	2.2700000
	1.7200000
	1.0800000
	1.6600000
2.8600000	2.6900000
	3.1300000
	2.3900000
	5.1400000
5.7200000	8.0800000
	8.5600000
	6.7900000
	5.4900000
14.300000	14.380000
	14.360000
	19.450000
	8.5100000
28.610000	28.170000
	27.890000
	33.510000
	33.940000

CERTIFICATION ANALYSIS

Report Date: 09/19/88

Method Name: TXPHEN
Compound: TXPHEN
Units of Measure: UGG

Laboratory: ES
Analysis Date: 08/16
Matrix: SO

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0
	0
	0
	0
0.0560000	0.0940000
	0.1090000
	0.0710000
	0.1150000
0.1120000	0.1490000
	0.1900000
	0.1980000
	0.1610000
0.2240000	0.2360000
	0.1940000
	0.2920000
	0.3020000
0.5600000	0.6500000
	0.6090000
	0.6690000
	0.3680000
1.1200000	1.2880000
	1.2840000
	2.0600000
	1.6400000

CERTIFICATION ANALYSIS

Report Date: 07/07/88

Method Name: 33DCBD
Compound: 33DCBD
Units of Measure: UGG

Laboratory: ES
Analysis Date: 04/09/87
Matrix: SO

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0
	0
1.3300000	0
	0
3.3300000	0.7264100
	1.1434800
6.6700000	1.3353500
	3.0323900
13.300000	8.8805800
	7.6322100

CERTIFICATION ANALYSIS

Report Date: 06/10/87

Method Name: 3-3'-DICHLOROBENZIDINE
Compound: 3-3DCB
Units of Measure: UGL

Laboratory: ES
Analysis Date: 03/18/87
Matrix: WA

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0
	0
0.5000000	0
	0
1	0
	0
2	1.1100000
	0.8200000
5	3.7200000
	4.6600000
10	6.9200000
	7.9500000
20	21.190000
	27.960000
50	61.480000
	82.050000

CERTIFICATION ANALYSIS

Report Date: 07/07/88

Method Name: CL6CP
Compound: CL6CP
Units of Measure: UGG

Laboratory: ES
Analysis Date: 04/09/87
Matrix: SO

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0
	0
1.3300000	0.0215200
	0
3.3300000	0.0930200
	0.0705000
6.6700000	0.4207900
	0.5663100
13.300000	1.8715000
	1.5049800

CERTIFICATION ANALYSIS

Report Date: 11/10/87

Method Name: CL6CP
Compound: CL6CP
Units of Measure: UGL

Laboratory: ES
Analysis Date: 03/18/87
Matrix: WA

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0
	0
0.5000000	0
	0
1	0.3400000
	0
2	0.9100000
	0.9400000
5	2.7600000
	3.3300000
10	5.1300000
	6.0500000
20	10.730000
	11.970000
50	31.780000
	38.700000
100	61.620000
	78.650000

CERTIFICATION ANALYSIS

Report Date: 02/23/88

Method Name: CH2CL2
Compound: CH2CL2
Units of Measure: ~~UGG~~ ug/kg

Laboratory: ES
Analysis Date: 01/20/88
Matrix: SO

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	4.9000000
	0
0.5000000	0.6900000
	0
1	0.6300000
	1.5700000
2	3.7400000
	4.1000000
5	8.1800000
	11.730000
10	12.540000
	20.540000
20	28.910000
	25.060000
50	51.690000
	51.710000
100	95.890000
	93.700000
200	208.02000
	198.59000

CERTIFICATION ANALYSIS

Report Date: 05/11/88

Method Name: 26DNT
Compound: 26DNT
Units of Measure: UGG

Laboratory: ES
Analysis Date: 05/[redacted]/88
Matrix: SO[redacted]

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0
	0.1190000
	0.0410000
	0
0.5240000	0.4880000
	0.7980000
	0.6180000
	0.3680000
1.0480000	1.0200000
	1.3400000
	1.1400000
	1
2.6200000	2.5400000
	2.5900000
	2.5400000
	2.4600000
5.2400000	5.6200000
	5.8200000
	5.1400000
	5.2800000
10.480000	9.7900000
	10.500000
	10.100000
	10.400000
26.200000	26.700000
	24.500000
	23.700000
	27.800000

CERTIFICATION ANALYSIS

Report Date: 10/07/8

Method Name: NB
Compound: NB
Units of Measure: UGG

Laboratory: ES
Analysis Date: 05/11/8
Matrix: SO

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0
	0
	0.1630000
	0.1940000
0.5480000	0
	0.2850000
	0.5900000
	0.6180000
1.0960000	0.2640000
	0.8500000
	1.0600000
	1.1900000
2.7400000	1.0300000
	1.1200000
	1.7900000
	2.3200000
5.4800000	3.4100000
	4.7800000
	4.5100000
	5.0900000
10.960000	6.9600000
	9.4900000
	9.0600000
	8.9300000
27.400000	12.900000
	14.400000
	17.800000
	14.700000

CERTIFICATION ANALYSIS

Report Date: 07/09/88

Method Name: ALDRN
Compound: ALDRN
Units of Measure: UGL

Laboratory: ES
Analysis Date: 06/1[redacted]8
Matrix: WA

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0
	0
	0
	0
0.0242500	0.0390700
	0.0378100
	0.0407700
	0.0497600
0.0606300	0.0500200
	0.0508600
	0.0881000
	0.1283000
0.1212500	0.0863600
	0.0956300
	0.1460100
	0.1070700
0.2425000	0.1502900
	0.1918100
	0.2067600
	0.1451200
0.6062500	0.4247400
	0.3771000
	0.5387700
	0.4218000

CERTIFICATION ANALYSIS

Report Date: 04/03/91

Method Name: 13DNB
Method Number:
Compound: 13DNB

Units of Measure: UGL
Laboratory: ES
Analysis Date 03/28/91
Matrix: WA

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0
	0
	0
	0
0.1375000	0.0136700
	0.0095000
	0.1061800
	0.1178700
0.2750000	0.1598400
	0.1391100
	0.2573400
	0.2602900
0.5500000	0.4566000
	0.4363100
	0.5104200
	0.5317100
1.3750000	1.3340000
	1.3488000
	1.4641000
	1.4094000
2.7500000	2.7489000
	2.5636000
	2.7940000
	2.6513000
5.5000000	5.9239000
	5.7431000
	6.1466000
	5.6164000
13.750000	13.485000
	13.949000
	14.230000
	14.292000

CERTIFICATION ANALYSIS

Report Date: 04/03/91

Method Name: 13DNB
Method Number:
Compound: 13DNB

Units of Measure: UGL
Laboratory: ES
Analysis Date 03/28/91
Matrix: WA

TABLE OF DATA POINTS

Target Concentration	Found Concentration
27.500000	26.411000
	26.416000
	28.310000
	26.021000
55	53.110000
	50.638000
	52.794000
	51.093000

CERTIFICATION ANALYSIS

Report Date: 04/02/91

Method Name: 24DNT
Method Number:
Compound: 24DNT

Units of Measure: UGL
Laboratory: ES
Analysis Date 03/28/91
Matrix: WA

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0
	0
	0
	0
0.0530000	0.0490000
	0.0493400
	0.0377500
	0.0350600
0.1060000	0.0864300
	0.0934000
	0.0795100
	0.0785600
0.2120000	0.1807000
	0.1765400
	0.1482000
	0.1861900
0.5300000	0.4780400
	0.4555300
	0.5149000
	0.4529000
1.0600000	0.9535100
	0.7882300
	0.9628200
	0.8645600
2.1200000	1.9533000
	1.8720000
	2.1351000
	1.8556000
5.3000000	4.7153000
	4.7397000
	5.0426000
	5.1337000

CERTIFICATION ANALYSIS

Report Date: 04/02/91

Method Name: 24DNT
Method Number:
Compound: 24DNT

Units of Measure: UGL
Laboratory: ES
Analysis Date 03/28/91
Matrix: WA

TABLE OF DATA POINTS

Target Concentration	Found Concentration
10.600000	8.9721000
	9.3073000
	10.150000
	9.6581000
21.200000	20.210000
	18.615000
	20.709000
	19.637000

CERTIFICATION ANALYSIS

Report Date: 04/02/91

Method Name: 246TNT
Method Number:
Compound: 246TNT

Units of Measure: UGL
Laboratory: ES
Analysis Date 03/28/91
Matrix: WA

TABLE OF DATA POINTS

Target Concentration	Found Concentration
0	0
	0
	0
	0
0.2800000	0.7114500
	0.6983100
	0.4238600
	0.3136800
0.5600000	0.8912500
	0.8869900
	0.6301700
	0.5862600
1.1200000	1.3825000
	1.3703000
	1.0441000
	1.1569000
2.8000000	2.6892000
	2.7938000
	2.9461000
	2.6997000
5.6000000	4.7566000
	4.5692000
	5.4332000
	5.0200000
11.200000	9.2630000
	9.3419000
	11.719000
	10.296000
28	21.109000
	22.961000
	27.117000
	27.172000

CERTIFICATION ANALYSIS

Report Date: 04/02/91

Method Name: 246TNT
Method Number:
Compound: 246TNT

Units of Measure: UGL
Laboratory: ES
Analysis Date 03/28/91
Matrix: WA

TABLE OF DATA POINTS

Target Concentration	Found Concentration
56	43.012000
	45.966000
	54.544000
	50.171000
112	102.91000
	100.70000
	107.44000
	102.04000

ESE BATCH : -PQL

QC TYPE : FDER/SW
ANALYST : KELLY WAGGONER
EXTRACTOR : CHRISTINE THOMPSON
DATA ENTRY : KELLY WAGGONER

REPORT DATE/TIME : 01/14/94 10:46:27
ANALYSIS DATE : 01/13/94
EXTRACT DATE : 01/10/94

STATUS :

METHOD BLANK CORRECTION METHOD : NONE

BATCH NOTES
EXPLOSIVES IN SOIL BY HPLC

Sample Specific Raw Data

SAMPLE CODE	EXTRACT DATE	ANALYSIS DATE	ANALYSIS TIME	SAMPLE WEIGHT (G)	EXTRACT VOLUME (ML)	INJECTION VOLUME (NA)	%MOISTURE
CCV*011094*1		01/10/94	08:32PM				
CCS*011394*1		01/13/94	04:40PM				
MB*QC*1		01/13/94	05:11PM	1	16		0.05
MB*QC*2		01/13/94	05:42PM	1	16		0.05
SP1*QC*1		01/13/94	06:13PM	1	16.8		0.05
SP2*QC*1		01/13/94	06:44PM	1	16.8		0.05
CCS*011394*2		01/13/94	07:15PM				

[redacted]meter Specific Raw Data

MPLE E	STORET NAME	STATUS	RESPONSE (NA)	DIL	TYPE	CURVE	RET TIME	SPIKE SOL CONC (UG/ML)	SPIKE SAMP VOL (G)	SPIKE VOLUME (ML)	DIL CODE	CALC'D TARGET (UG/G)
CCV*011094*1	NB	OK	329001	1		2	10.07					1.52
	24DNT	OK	1019813	1		2	14.86					1.55
CCS*011394*1	NB	OK	755400	1	MANUAL	1	10.22					735512
	24DNT	OK	1520733	1	MANUAL	1	14.83					1443067
MB*QC*1	NB	OK	0		FINAL		0					
	24DNT	OK	0		FINAL		0					
MB*QC*2	NB	OK	0		FINAL		0					
	24DNT	OK	0		FINAL		0					
SP1*QC*1	NB	OK	3343	1		1	10.12	2.58	1	0.1	N	0.25813
	24DNT	OK	9237	1		1	14.35	2.70	1	0.1	N	0.27014
SP2*QC*1	NB	OK	3075	1		1	10.22	2.58	1	0.1	N	0.25813
	24DNT	OK	9173	1		1	14.55	2.70	1	0.1	N	0.27014
CCS*011394*2	NB	OK	744192	1	MANUAL	1	10.18					735512
	24DNT	OK	1495009	1	MANUAL	1	14.89					1443067

XET: 98774 METHOD: LW12 NITROBENZENE,SOIL, UG/G-DRY LINE

LIBRATION CURVE # 1 (UG/ML)
CURVE DETECTION LIMIT= DATE: 10 JAN 1994 LARGEST RESPONSE=142490(USER DEFINED) %RSD=1.8063

CONC :	0	0.0320	0.0640	0.1280	0.6400
RESP :	0	7146	13771	28600	142490
CONC':	0.0004	0.033	0.062	0.129	0.640
R.T.:	0	9.97	10.00	10.03	10.08

CONC = 4.4300E-04+ 4.4883E-06*RESP+ *RESP**2+ *RESP**3
95% C.I.= 1.2777E-03 1.9548E-08
CORRELATION COEFFICIENT = 1.0000

CALIBRATION CURVE # 2 (UG/ML)
CURVE DETECTION LIMIT= DATE: 10 JAN 1994 LARGEST RESPONSE=735512(USER DEFINED) %RSD=2.3369

CONC :	0	0.0320	0.0640	0.1280	0.6400	3.2000
RESP :	0	7146	13771	28600	142490	735512
CONC':	0.005	0.036	0.065	0.130	0.625	3.20
R.T.:	0	9.97	10.00	10.03	10.08	10.06

CONC = 5.2895E-03+ 4.3474E-06*RESP+ *RESP**2+ *RESP**3
95% C.I.= 7.9155E-03 2.5856E-08
CORRELATION COEFFICIENT = 1.0000

METHOD BLANK(S)

SAMPLE ID	CONCENTRATION
QC*1	0.0
QC*2	0.0

CONTINUING CALIBRATION STANDARD(S)

STANDARD ID	CALC. CONC	KNOWN CONC	DIFFERENCE%
011394*1	755000	736000	2.6
011394*2	744000	736000	1.1

CONTINUING CALIBRATION VERIFICATION SAMPLE(S)

SAMPLE ID	CALC. CONC	KNOWN CONC	DIFFERENCE%
011094*1	1.44	1.52	-5.3

.ANDARD MATRIX SPIKE(S)

SAMPLE ID	UNSP CONC	SPK CONC	FOUND	TARGET	% RECV	REL%DIFF.
SP1*QC*1	0.0	0.260	0.260	0.258	100.8	
SP2*QC*1	0.0	0.239	0.239	0.258	92.6	

STORET: 98575 METHOD: LW12 2,4-DNT,SOIL, UG/G-DRY LINE

CALIBRATION CURVE # 1 (UG/ML)
CURVE DETECTION LIMIT= DATE: 10 JAN 1994 LARGEST RESPONSE=310473(USER DEFINED) %RSD=2.3948

CONC :	0	0.0214	0.0429	0.0858	0.4288
RESP :	0	15004	29375	61213	310473
CONC':	0.001	0.022	0.042	0.085	0.429
R.T.:	0.0	14.51	14.59	14.75	14.87

CONC = 1.1020E-03+ 1.3781E-06*RESP+ *RESP**2+ *RESP**3
95% C.I.= 1.1219E-03 7.8847E-09
CORRELATION COEFFICIENT = 1.0000

CALIBRATION CURVE # 2 (UG/ML)
CURVE DETECTION LIMIT= DATE: 10 JAN 1994 LARGEST RESPONSE=1443067(USER DEFINED) %RSD=2.9619

CONC :	0	0.0214	0.0429	0.0858	0.4288	2.1440
RESP :	0	15004	29375	61213	310473	1443067
CONC':	-.007	0.015	0.037	0.084	0.455	2.14
R.T.:	0.0	14.51	14.59	14.75	14.87	14.81

CONC = -6.8766E-03+ 1.4868E-06*RESP+ *RESP**2+ *RESP**3
95% C.I.= 1.3384E-02 2.2185E-08
CORRELATION COEFFICIENT = .9999

METHOD BLANK(S)

SAMPLE ID	CONCENTRATION
QC*1	0.0
QC*2	0.0

.NTINUING CALIBRATION STANDARD(S)

STANDARD ID	CALC. CONC	KNOWN CONC	DIFFERENCE%
011394*1	1520000	1440000	5.6
011394*2	1500000	1440000	4.2

CONTINUING CALIBRATION VERIFICATION SAMPLE(S)

LE ID	CALC. CONC	KNOWN CONC	DIFFERENCE%
094*1	1.51	1.55	-2.6

STANDARD MATRIX SPIKE(S)

SAMPLE ID	UNSP CONC	SPK CONC	FOUND	TARGET	% RECV	REL%DIFF.
SP1*QC*1	0.0	0.232	0.232	0.270	85.9	
SP2*QC*1	0.0	0.231	0.231	0.270	85.6	

ESE BATCH : G46125

TYPE : ESE
ALYST : SCOTT MCMILLEN
EXTRACTOR : CHRISTINE THOMPSON
DATA ENTRY : SCOTT MCMILLEN

REPORT DATE/TIME : 01/27/94 09:51:40
ANALYSIS DATE : 01/18/94
EXTRACT DATE : 01/10/94

STATUS :

METHOD BLANK CORRECTION METHOD : NONE

BATCH NOTES
PQL STUDY FOR UW32

Sample Specific Raw Data

SAMPLE CODE	EXTRACT DATE	ANALYSIS DATE	ANALYSIS TIME	SAMPLE VOLUME (ML)	EXTRACT VOLUME (ML)	INJECTION VOLUME (NA)	%MOISTURE
CCS*978211-B*1		01/18/94	05:35PM				
CCV*978221-B*1		01/12/94	02:11AM				
MB1*QC*1	01/10/94	01/18/94	06:06PM	500	6		
MB2*QC*1	01/10/94	01/18/94	06:38PM	500	6		
SP1*QC*1	01/10/94	01/18/94	07:09PM	500	6		
SP2*QC*1	01/10/94	01/18/94	07:40PM	500	6		
CCS*978211-B*2		01/18/94	08:12PM				

arameter Specific Raw Data

SAMPLE	STORET NAME	STATUS	RESPONSE (PK AREA)	DIL	TYPE	CURVE	RET TIME	SPIKE SOL CONC (UG/ML)	SPIKE SAMP VOL (L)	SPIKE VOLUME (ML)	DIL CODE	CALC'D TARGET (UG/L)
CCS*978211-B*1	13DNB	OK	11836936	1	MANUAL	1	12.99					11981997
	246TNT	OK	9971778	1	MANUAL	1	16.18					10031557
	24DNT	OK	1309873	1	MANUAL	1	19.50					1326780
	3,4-DNT	OK	7013648	1	MANUAL	1	15.54					7059305
CCV*978221-B*1	13DNB	OK	6037407	1		2	13.06					3536
	246TNT	OK	6794527	1		2	16.39					5424
	24DNT	OK	1661693	1		1	19.96					1072
	3,4-DNT	OK	3537566	1		1	15.75					5168
MB1*QC*1	13DNB	OK	0		FINAL		0					
	246TNT	OK	0		FINAL		0					
	24DNT	OK	0		FINAL		0					
	3,4-DNT	OK	360689	1		1	15.97	6.24	0.5	0.5	N	6.24
MB2*QC*1	13DNB	OK	0		FINAL		0					
	246TNT	OK	0		FINAL		0					
	24DNT	OK	0		FINAL		0					
	3,4-DNT	OK	366242	1		1	15.80	6.24	0.5	0.5	N	6.24
SP1*QC*1	13DNB	OK	16498	1		1	13.16	0.053	0.5	1.0	N	.106
	246TNT	OK	11261	1		1	16.28	0.054	0.5	1.0	N	.108
	24DNT	OK	3190	1		1	19.87	0.011	0.5	1.0	N	.022
	3,4-DNT	OK	360642	1		1	15.76	6.24	0.5	0.5	N	6.24
SP2*QC*1	13DNB	OK	19664	1		1	13.18	0.053	0.5	1.0	N	.106
	246TNT	OK	12250	1		1	16.27	0.054	0.5	1.0	N	.108
	24DNT	OK	6132	1		1	19.87	0.011	0.5	1.0	N	.022
	3,4-DNT	OK	358495	1		1	15.78	6.24	0.5	0.5	N	6.24
CCS*978211-B*2	13DNB	OK	12114099	1	MANUAL	1	13.05					11981997
	246TNT	OK	10214560	1	MANUAL	1	16.32					10031557
	24DNT	OK	1344339	1	MANUAL	1	19.79					1326780
	3,4-DNT	OK	7108981	1	MANUAL	1	15.68					7059305

STORET: 99724 METHOD: UW32 1,3-DINITROBENZENE, UG/L QUAD

CALIBRATION CURVE # 1 (UG/L)
CURVE DETECTION LIMIT= DATE: 11 JAN 1994 LARGEST RESPONSE=585518(USER DEFINED) %RSD=2.4999

CONC :	0	37.12	74.24	148.5	371.2
RESP :	0	60716	124358	240052	585518
CONC':	-.209	36.6	75.7	148	371
R.T.:		13.06	13.06	13.10	13.15

CONC = -2.0889E-01+ 6.0350E-04*RESP+ 5.2869E-11*RESP**2+ *RESP**3
95% C.I.= 1.9875E+00 2.0985E-05 3.3227E-11
CORRELATION COEFFICIENT = 1.0000

CALIBRATION CURVE # 2 (UG/L)
CURVE DETECTION LIMIT= DATE: 11 JAN 1994 LARGEST RESPONSE=11981997 %RSD=2.0371

CONC :	0	37.12	74.24	148.5	371.2	742.4	1485	7424
RESP :	0	60716	124358	240052	585518	1237325	2427751	11981997
CONC':	1.56	38.4	77.1	147	357	755	1480	7420
R.T.:		13.06	13.06	13.10	13.15	13.16	13.30	13.36

CONC = 1.5634E+00+ 6.0729E-04*RESP+ 1.0165E-12*RESP**2+ *RESP**3
95% C.I.= 8.2811E+00 9.3937E-06 7.6106E-13
CORRELATION COEFFICIENT = 1.0000

METHOD BLANK(S)

SAMPLE ID	CONCENTRATION
QC*1	0.0
QC*1	0.0

CONTINUING CALIBRATION STANDARD(S) *** Optional Quality Control Check ***

STANDARD ID	CALC. CONC	KNOWN CONC	DIFFERENCE%
978211-B*1	11800000	12000000	-1.7
978211-B*2	12100000	12000000	0.8

CONTINUING CALIBRATION VERIFICATION SAMPLE(S) *** Optional Quality Control Check ***

SAMPLE ID	CALC. CONC	KNOWN CONC	DIFFERENCE%
9221-B*1	3710	3540	4.8

STANDARD MATRIX SPIKE(S) *** Optional Quality Control Check ***

SAMPLE ID	UNSP CONC	SPK CONC	FOUND	TARGET	% RECV	REL%DIFF.	
SP1*QC*1	0.0	0.117	0.117	0.106	110.4		SPIKE RECOVERY >
SP2*QC*1	0.0	0.140	0.140	0.106	132.1	17.9	SPIKE RECOVERY >

STORET: 81360 METHOD: UW32 2,4,6-TRINIT'TOLUENE, UG/L QUAD

CALIBRATION CURVE # 1 (UG/L)
CURVE DETECTION LIMIT= DATE: 11 JAN 1994 LARGEST RESPONSE=488515(USER DEFINED) %RSD=3.2852

CONC :	0	41.76	83.52	167	417.6
RESP :	0	47953	103511	199194	488515
CONC':	0.479	39.8	85.8	166	418
R.T.:		16.21	16.21	16.28	16.32

CONC = 4.7852E-01+ 8.1630E-04*RESP+ 7.7122E-11*RESP**2+ *RESP**3
95% C.I.= 3.6456E+00 4.6435E-05 8.8246E-11
CORRELATION COEFFICIENT = 1.0000

CALIBRATION CURVE # 2 (UG/L)
CURVE DETECTION LIMIT= DATE: 11 JAN 1994 LARGEST RESPONSE=14322976 %RSD=2.7770

CONC :	0	41.76	83.52	167	417.6	835.2	1670	8352	11480
RESP :	0	47953	103511	199194	488515	1018690	2016713	10031557	14322976
CONC':	-23.8	18.8	68.1	153	409	875	1740	8300	11500
R.T.:		16.21	16.21	16.28	16.32	16.35	16.50	16.60	16.51

CONC = -2.3812E+01+ 8.8814E-04*RESP+ -5.8164E-12*RESP**2+ *RESP**3
95% C.I.= 3.8057E+01 3.0186E-05 2.2117E-12
CORRELATION COEFFICIENT = 1.0000

METHOD BLANK(S)

SAMPLE ID	CONCENTRATION
QC*1	0.0
1	0.0

CONTINUING CALIBRATION STANDARD(S) *** Optional Quality Control Check ***

STANDARD ID	CALC. CONC	KNOWN CONC	DIFFERENCE%
978211-B*1	9970000	10000000	-.3
978211-B*2	10200000	10000000	2.0

CONTINUING CALIBRATION VERIFICATION SAMPLE(S) *** Optional Quality Control Check ***

[redacted]PLE ID	CALC. CONC	KNOWN CONC	DIFFERENCE%
[redacted]978221-B*1	5740	5420	5.9

STANDARD MATRIX SPIKE(S)

[redacted]AMPLE ID	UNSP CONC	SPK CONC	FOUND	TARGET	% RECV	REL%DIFF.
[redacted]SP1*QC*1	0.0	0.116	0.116	0.108	107.4	
[redacted]SP2*QC*1	0.0	0.126	0.126	0.108	116.7	8.3

STORET: 34611 METHOD: UW32 2,4-DINITROTOLUENE, UG/L QUAD

CALIBRATION CURVE # 1 (UG/L)

CURVE DETECTION LIMIT= DATE: 11 JAN 1994 LARGEST RESPONSE=4159220 %RSD=5.3038

CONC :	0	4.584	9.168	18.34	45.84	91.68	183.4	916.8	2750
RESP :	0	5784	13357	26455	62770	132879	263092	1326780	4159220
CONC':	-.147	3.93	9.26	18.5	44.0	93.3	185	916	2750
R.T.:		19.60	19.58	19.68	19.74	19.77	19.96	20.07	20.00

CONC = -1.4747E-01+ 7.0465E-04*RESP+ -1.0440E-11*RESP**2+ *RESP**3

95% C.I.= 9.1513E-01 2.7072E-06 6.5178E-13

CORRELATION COEFFICIENT = 1.0000

METHOD BLANK(S)

SAMPLE ID	CONCENTRATION
QC*1	0.0
QC*1	0.0

CONTINUING CALIBRATION STANDARD(S) *** Optional Quality Control Check ***

STANDARD ID	CALC. CONC	KNOWN CONC	DIFFERENCE%
978211-B*1	1310000	1330000	-1.5
978211-B*2	1340000	1330000	0.8

CONTINUING CALIBRATION VERIFICATION SAMPLE(S) *** Optional Quality Control Check ***

SAMPLE ID	CALC. CONC	KNOWN CONC	DIFFERENCE%
978221-B*1	1140	1070	6.5

STANDARD MATRIX SPIKE(S)

SAMPLE ID	UNSP CONC	SPK CONC	FOUND	TARGET	% RECV	REL%DIFF.	
SP1*QC*1	0.0	0.025	0.025	0.022	113.6		
SP2*QC*1	0.0	0.050	0.050	0.022	227.3	66.7	SPIKE RECOVERY > 121 REPLICATE % DIFFERENCE > 33

[redacted]ET: 96918 METHOD: SUR 3,4-DNT, UG/L QUAD

CALIBRATION CURVE # 1 (UG/L)

CURVE DETECTION LIMIT= DATE: 11 JAN 1994 LARGEST RESPONSE=7059306 %RSD=2.3818

CONC :	0	53.6	107.2	214.4	536	1072	2144	10720
RESP :	0	34454	73057	140318	346634	731529	1406530	7059306
CONC':	-1.39	50.7	109	211	523	1110	2130	10700
R.T.:		15.63	15:62	15.69	15.73	15.76	15.93	16.01

CONC = -1.3946E+00+ 1.5131E-03*RESP+ 8.1074E-13*RESP**2+ *RESP**3

95% C.I.= 1.7436E+01 3.3841E-05 4.6525E-12

CORRELATION COEFFICIENT = 1.0000

[redacted]URROGATE SPIKE(S)

QC.TYPE*FG*SEQ	PARAMETER		FOUND	TARGET	% RECV
CCS*978211-B*1	96918*SUR 3,4-DNT	UG/L	7010000	7060000	99.3
CCV*978221-B*1	96918*SUR 3,4-DNT	UG/L	5360	5170	103.7
MB1*QC*1	96918*SUR 3,4-DNT	UG/L	6.53	6.24	104.6
MB2*QC*1	96918*SUR 3,4-DNT	UG/L	6.63	6.24	106.3
SP1*QC*1	96918*SUR 3,4-DNT	UG/L	6.53	6.24	104.6
SP2*QC*1	96918*SUR 3,4-DNT	UG/L	6.49	6.24	104.0
CCS*978211-B*2	96918*SUR 3,4-DNT	UG/L	7110000	7060000	100.7

ATTACHMENT E-4

LABORATORY CONTROL SAMPLE RESULTS

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	DNZA		TL	S	10.000	CQC			SD09/W	03-SEP-93		10	UGL			
			TL	S	20.000	CQC			SD09/W	03-SEP-93		20.7	UGL			
			TL	S	20.000	CQC			SD09/W	03-SEP-93		20.5	UGL			
ES	DPXA		CL10BP	S	1.250	CQC			UH02/W	30-AUG-93		.79	UGL	Z		
			CL10BP	S	1.250	CQC			UH02/W	30-AUG-93		.75	UGL	Z		
			PCB016	S	3.750	CQC			UH02/W	30-AUG-93		2.1	UGL			
			PCB260	S	3.750	CQC			UH02/W	30-AUG-93		2.4	UGL			
ES	EFUA		SE	S	5.000	CQC			SD21/W	03-SEP-93		5.2	UGL			
			SE	S	75.000	CQC			SD21/W	03-SEP-93		74	UGL			
			SE	S	75.000	CQC			SD21/W	03-SEP-93		73.7	UGL			
ES	ESQA		AS	S	5.000	CQC			SD22/W	02-SEP-93		5.2	UGL			
			AS	S	75.000	CQC			SD22/W	03-SEP-93		74.2	UGL			
			AS	S	75.000	CQC			SD22/W	03-SEP-93		75.7	UGL			
ES	EVVA		BA	S	10.000	CQC			SS10/W	01-SEP-93		9.79	UGL			
			BA	S	3750.000	CQC			SS10/W	01-SEP-93		3570	UGL			
			BA	S	7500.000	CQC			SS10/W	01-SEP-93		7310	UGL			
			BA	S	7500.000	CQC			SS10/W	01-SEP-93		7220	UGL			
			CA	S	1000.000	CQC			SS10/W	01-SEP-93		1020	UGL			
			CA	S	7500.000	CQC			SS10/W	01-SEP-93		7380	UGL			
			CA	S	15000.000	CQC			SS10/W	01-SEP-93		14900	UGL			
			CA	S	15000.000	CQC			SS10/W	01-SEP-93		14800	UGL			
			CD	S	15.000	CQC			SS10/W	01-SEP-93		15	UGL			
			CD	S	2000.000	CQC			SS10/W	01-SEP-93		1870	UGL			
			CD	S	4000.000	CQC			SS10/W	01-SEP-93		3800	UGL			
			CD	S	4000.000	CQC			SS10/W	01-SEP-93		3790	UGL			
			CO	S	50.000	CQC			SS10/W	01-SEP-93		48.7	UGL			
			CO	S	20000.000	CQC			SS10/W	01-SEP-93		18900	UGL			
			CO	S	40000.000	CQC			SS10/W	01-SEP-93		38200	UGL			
			CO	S	40000.000	CQC			SS10/W	01-SEP-93		38000	UGL			
			CR	S	10.000	CQC			SS10/W	01-SEP-93		10	UGL			
			CR	S	2000.000	CQC			SS10/W	01-SEP-93		1890	UGL			
			CR	S	4000.000	CQC			SS10/W	01-SEP-93		3820	UGL			
			CR	S	4000.000	CQC			SS10/W	01-SEP-93		3800	UGL			
			CU	S	20.000	CQC			SS10/W	01-SEP-93		20.9	UGL			
			CU	S	4000.000	CQC			SS10/W	01-SEP-93		3780	UGL			
			CU	S	8000.000	CQC			SS10/W	01-SEP-93		7760	UGL			
			CU	S	8000.000	CQC			SS10/W	01-SEP-93		7680	UGL			
			MG	S	1000.000	CQC			SS10/W	01-SEP-93		983	UGL			
			MG	S	7500.000	CQC			SS10/W	01-SEP-93		7310	UGL			
			MG	S	15000.000	CQC			SS10/W	01-SEP-93		15000	UGL			
			MG	S	15000.000	CQC			SS10/W	01-SEP-93		14900	UGL			
			MN	S	10.000	CQC			SS10/W	01-SEP-93		9.7	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Value	Unit	Flag Codes	Data Quals	Prog
ES	EVVA		MN	S	750.000	CQC			SS10/W	01-SEP-93		722	UGL			
			MN	S	1500.000	CQC			SS10/W	01-SEP-93		1460	UGL			
			MN	S	1500.000	CQC			SS10/W	01-SEP-93		1450	UGL			
			NA	S	1000.000	CQC			SS10/W	01-SEP-93		1060	UGL			
			NA	S	20000.000	CQC			SS10/W	01-SEP-93		19000	UGL			
			NA	S	40000.000	CQC			SS10/W	01-SEP-93		38800	UGL			
			NA	S	40000.000	CQC			SS10/W	01-SEP-93		38500	UGL			
			NI	S	50.000	CQC			SS10/W	01-SEP-93		48.8	UGL			
			NI	S	6000.000	CQC			SS10/W	01-SEP-93		5550	UGL			
			NI	S	12000.000	CQC			SS10/W	01-SEP-93		11300	UGL			
			NI	S	12000.000	CQC			SS10/W	01-SEP-93		11200	UGL			
			ZN	S	40.000	CQC			SS10/W	01-SEP-93		38.3	UGL			
			ZN	S	7500.000	CQC			SS10/W	01-SEP-93		6970	UGL			
			ZN	S	15000.000	CQC			SS10/W	01-SEP-93		14100	UGL			
			ZN	S	15000.000	CQC			SS10/W	01-SEP-93		14100	UGL			
ES	EWMA		PB	S	10.000	CQC			SD20/W	03-SEP-93		9	UGL			
			PB	S	80.000	CQC			SD20/W	03-SEP-93		73	UGL			
			PB	S	80.000	CQC			SD20/W	03-SEP-93		75.1	UGL			
ES	FBZA		AENSLF	S	.500	CQC			UH13/W	23-AUG-93		.406	UGL			
			ALDRN	S	.500	CQC			UH13/W	23-AUG-93		.296	UGL			
			BENSLF	S	.500	CQC			UH13/W	23-AUG-93		.502	UGL			
			CL10BP	S	1.250	CQC			UH13/W	23-AUG-93		1.1	UGL	Z		
			CL10BP	S	1.250	CQC			UH13/W	23-AUG-93		.92	UGL	Z		
			CL4XYL	S	1.250	CQC			UH13/W	23-AUG-93		.876	UGL	Z		
			CL4XYL	S	1.250	CQC			UH13/W	23-AUG-93		.652	UGL	Z		
			DLDRN	S	.500	CQC			UH13/W	23-AUG-93		.441	UGL			
			ENDRN	S	.500	CQC			UH13/W	23-AUG-93		.434	UGL			
			HPCL	S	.500	CQC			UH13/W	23-AUG-93		.325	UGL			
			ISODR	S	1.000	CQC			UH13/W	23-AUG-93		.594	UGL			
			LIN	S	.500	CQC			UH13/W	23-AUG-93		.315	UGL			
			MEXCLR	S	1.000	CQC			UH13/W	23-AUG-93		.897	UGL			
			PPDDT	S	.500	CQC			UH13/W	23-AUG-93		.339	UGL			
ES	FMEA		C6H6	S	.396	CQC			LO02/S	06-NOV-93		.418	UGG			
			C6H6	S	3.960	CQC			LO02/S	06-NOV-93		3.31	UGG			
			C6H6	S	3.960	CQC			LO02/S	06-NOV-93		3.53	UGG			
			ETC6H5	S	.400	CQC			LO02/S	06-NOV-93		.447	UGG			
			ETC6H5	S	4.000	CQC			LO02/S	06-NOV-93		3.7	UGG			
			ETC6H5	S	4.000	CQC			LO02/S	06-NOV-93		3.94	UGG			
			MEC6H5	S	.396	CQC			LO02/S	06-NOV-93		.43	UGG			
			MEC6H5	S	3.960	CQC			LO02/S	06-NOV-93		3.51	UGG			
			MEC6H5	S	3.960	CQC			LO02/S	06-NOV-93		3.74	UGG			
ES	FQNA		HG	S	.500	CQC			SB01/W	26-AUG-93		.461	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Value	Unit	Flag Codes	Data Quals	Prog
ES	FQNA		HG	S	2.500	CQC			SB01/W	26-AUG-93		2.51	UGL			
			HG	S	2.500	CQC			SB01/W	26-AUG-93		2.43	UGL			
ES	FXQA		135TNB	S	.934	CQC			UW32/W	20-AUG-93		.627	UGL			
			135TNB	S	9.340	CQC			UW32/W	20-AUG-93		6.31	UGL			
			135TNB	S	9.340	CQC			UW32/W	20-AUG-93		6.03	UGL			
			135TNB	S	46.700	CQC			UW32/W	20-AUG-93		45.8	UGL			
			246TNT	S	1.300	CQC			UW32/W	20-AUG-93		1.29	UGL			
			246TNT	S	13.000	CQC			UW32/W	20-AUG-93		11.8	UGL			
			246TNT	S	13.000	CQC			UW32/W	20-AUG-93		11	UGL			
			246TNT	S	78.100	CQC			UW32/W	20-AUG-93		68	UGL			
			24DNT	S	.136	CQC			UW32/W	20-AUG-93		.117	UGL			
			24DNT	S	1.360	CQC			UW32/W	20-AUG-93		1.18	UGL			
			24DNT	S	1.360	CQC			UW32/W	20-AUG-93		.964	UGL			
			24DNT	S	18.200	CQC			UW32/W	20-AUG-93		14.3	UGL			
			2NT	S	.757	CQC			UW32/W	20-AUG-93		.63	UGL			
			2NT	S	7.570	CQC			UW32/W	20-AUG-93		5.63	UGL			
			2NT	S	7.570	CQC			UW32/W	20-AUG-93		5.32	UGL			
			2NT	S	90.800	CQC			UW32/W	20-AUG-93		69.7	UGL			
			34DNT	S	5.900	CQC			UW32/W	20-AUG-93		5.65	UGL	Z		
			34DNT	S	5.900	CQC			UW32/W	20-AUG-93		4.78	UGL	Z		
			34DNT	S	5.900	CQC			UW32/W	20-AUG-93		5.29	UGL	Z		
			34DNT	S	5.900	CQC			UW32/W	20-AUG-93		4.67	UGL	Z		
			34DNT	S	5.900	CQC			UW32/W	20-AUG-93		5.18	UGL	Z		
			NB	S	1.150	CQC			UW32/W	20-AUG-93		.94	UGL			
			NB	S	11.500	CQC			UW32/W	20-AUG-93		9.13	UGL			
			NB	S	11.500	CQC			UW32/W	20-AUG-93		8.48	UGL			
			NB	S	91.800	CQC			UW32/W	20-AUG-93		70.6	UGL			
			RDX	S	2.320	CQC			UW32/W	20-AUG-93		2.06	UGL			
			RDX	S	23.200	CQC			UW32/W	20-AUG-93		21.3	UGL			
			RDX	S	23.200	CQC			UW32/W	20-AUG-93		20.9	UGL			
			RDX	S	95.000	CQC			UW32/W	20-AUG-93		83.1	UGL			
ES	GBKA		12DCD4	S	50.000	CQC			UM20/W	13-AUG-93		46	UGL			
			4BFB	S	50.000	CQC			UM20/W	13-AUG-93		51	UGL			
			MEC6D8	S	50.000	CQC			UM20/W	13-AUG-93		50	UGL			
ES	GCUA		12EPCH	S	5.000	CQC			UM18/W	07-SEP-93		6	UGL	S		
			246TBP	S	100.000	CQC			UM18/W	07-SEP-93		71	UGL			
			2FBP	S	50.000	CQC			UM18/W	07-SEP-93		44	UGL			
			2FP	S	100.000	CQC			UM18/W	07-SEP-93		61	UGL			
			NBD5	S	50.000	CQC			UM18/W	07-SEP-93		36	UGL			
			PHEND6	S	100.000	CQC			UM18/W	07-SEP-93		46	UGL			
			TRPD14	S	50.000	CQC			UM18/W	07-SEP-93		46	UGL			
ES	GWSA		TL	S	10.000	CQC			SD09/W	10-NOV-93		10.2	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	GWSA		TL	S	20.000	CQC			SD09/W	10-NOV-93		20.3	UGL			
			TL	S	20.000	CQC			SD09/W	10-NOV-93		19.9	UGL			
ES	HEPA		HG	S	.100	CQC			JB01/S	18-OCT-93		9.53 E -2	UGG			
			HG	S	.798	CQC			JB01/S	18-OCT-93		.805	UGG			
			HG	S	.800	CQC			JB01/S	18-OCT-93		.824	UGG			
ES	HEWA		HG	S	.100	CQC			JB01/S	02-NOV-93		.103	UGG			
			HG	S	.794	CQC			JB01/S	02-NOV-93		.786	UGG			
			HG	S	.797	CQC			JB01/S	02-NOV-93		.785	UGG			
ES	HEXA		HG	S	.100	CQC			JB01/S	09-NOV-93		.106	UGG			
			HG	S	.795	CQC			JB01/S	09-NOV-93		.863	UGG			
			HG	S	.797	CQC			JB01/S	09-NOV-93		.793	UGG			
ES	HEYA		HG	S	.100	CQC			JB01/S	11-NOV-93		.11	UGG			
			HG	S	.795	CQC			JB01/S	11-NOV-93		.816	UGG			
			HG	S	.800	CQC			JB01/S	11-NOV-93		.81	UGG			
ES	HHLA		SE	S	.497	CQC			JD15/S	12-NOV-93		.577	UGG			
			SE	S	7.420	CQC			JD15/S	12-NOV-93		6.48	UGG			
			SE	S	7.470	CQC			JD15/S	12-NOV-93		6.64	UGG			
ES	HHNA		SE	S	.495	CQC			JD15/S	04-DEC-93		.545	UGG			
			SE	S	7.570	CQC			JD15/S	04-DEC-93		7.36	UGG			
			SE	S	7.840	CQC			JD15/S	04-DEC-93		7.48	UGG			
ES	HHOA		SE	S	.500	CQC			JD15/S	09-DEC-93		.43	UGG			
			SE	S	7.470	CQC			JD15/S	09-DEC-93		6.96	UGG			
			SE	S	7.540	CQC			JD15/S	09-DEC-93		6.83	UGG			
ES	HHPA		SE	S	.496	CQC			JD15/S	06-DEC-93		.377	UGG			
			SE	S	7.960	CQC			JD15/S	06-DEC-93		7.19	UGG			
			SE	S	7.980	CQC			JD15/S	06-DEC-93		6.97	UGG			
ES	HNOA		SE	S	5.000	CQC			SD21/W	10-NOV-93		4.9	UGL			
			SE	S	75.000	CQC			SD21/W	10-NOV-93		73.5	UGL			
			SE	S	75.000	CQC			SD21/W	10-NOV-93		73.1	UGL			
ES	HOMA		AS	S	5.000	CQC			SD22/W	11-NOV-93		5.1	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	HOMA		AS	S	75.000	CQC			SD22/W	11-NOV-93		73.9	UGL			
			AS	S	75.000	CQC			SD22/W	11-NOV-93		74.6	UGL			
ES	HTPA		135TNB	S	.979	CQC			UW32/W	02-NOV-93		.881	UGL			
			135TNB	S	9.790	CQC			UW32/W	02-NOV-93		8.89	UGL			
			135TNB	S	9.790	CQC			UW32/W	02-NOV-93		9.39	UGL			
			135TNB	S	46.700	CQC			UW32/W	02-NOV-93		45.1	UGL			
			246TNT	S	1.300	CQC			UW32/W	02-NOV-93		1.18	UGL			
			246TNT	S	13.000	CQC			UW32/W	02-NOV-93		11	UGL			
			246TNT	S	13.000	CQC			UW32/W	02-NOV-93		11.5	UGL			
			246TNT	S	78.100	CQC			UW32/W	02-NOV-93		64.5	UGL			
			24DNT	S	.136	CQC			UW32/W	02-NOV-93		.139	UGL			
			24DNT	S	1.360	CQC			UW32/W	02-NOV-93		1.3	UGL			
			24DNT	S	1.360	CQC			UW32/W	02-NOV-93		1.29	UGL			
			24DNT	S	18.200	CQC			UW32/W	02-NOV-93		16.2	UGL			
			2NT	S	.757	CQC			UW32/W	02-NOV-93		.529	UGL			
			2NT	S	7.570	CQC			UW32/W	02-NOV-93		6.09	UGL			
			2NT	S	7.570	CQC			UW32/W	02-NOV-93		6.48	UGL			
			2NT	S	90.800	CQC			UW32/W	02-NOV-93		76.8	UGL			
			34DNT	S	5.900	CQC			UW32/W	02-NOV-93		5.72	UGL	Z		
			34DNT	S	5.900	CQC			UW32/W	02-NOV-93		5.44	UGL	Z		
			34DNT	S	5.900	CQC			UW32/W	02-NOV-93		5.72	UGL	Z		
			34DNT	S	5.900	CQC			UW32/W	02-NOV-93		5.84	UGL	Z		
			34DNT	S	5.900	CQC			UW32/W	02-NOV-93		5.63	UGL	Z		
			NB	S	1.150	CQC			UW32/W	02-NOV-93		.982	UGL			
			NB	S	11.500	CQC			UW32/W	02-NOV-93		9.69	UGL			
			NB	S	11.500	CQC			UW32/W	02-NOV-93		10.1	UGL			
			NB	S	91.800	CQC			UW32/W	02-NOV-93		79.6	UGL			
			RDX	S	2.320	CQC			UW32/W	02-NOV-93		2.09	UGL			
			RDX	S	23.200	CQC			UW32/W	02-NOV-93		19.8	UGL			
			RDX	S	23.200	CQC			UW32/W	02-NOV-93		20.3	UGL			
			RDX	S	94.500	CQC			UW32/W	02-NOV-93		84.5	UGL			
ES	HWKA		AG	S	.784	CQC			JS16/S	21-OCT-93		.749	UGG			
			AG	S	7.470	CQC			JS16/S	21-OCT-93		7.18	UGG			
			AG	S	7.520	CQC			JS16/S	21-OCT-93		7.15	UGG			
			BE	S	4.900	CQC			JS16/S	21-OCT-93		4.88	UGG			
			BE	S	46.700	CQC			JS16/S	21-OCT-93		45	UGG			
			BE	S	47.000	CQC			JS16/S	21-OCT-93		46.2	UGG			
			CD	S	4.900	CQC			JS16/S	21-OCT-93		4.96	UGG			
			CD	S	46.700	CQC			JS16/S	21-OCT-93		46.3	UGG			
			CD	S	47.000	CQC			JS16/S	21-OCT-93		46.7	UGG			
			CR	S	9.800	CQC			JS16/S	21-OCT-93		9.62	UGG			
			CR	S	93.300	CQC			JS16/S	21-OCT-93		88.1	UGG			
			CR	S	93.900	CQC			JS16/S	21-OCT-93		90.3	UGG			
			CU	S	4.900	CQC			JS16/S	21-OCT-93		4.78	UGG			
			CU	S	46.700	CQC			JS16/S	21-OCT-93		45.1	UGG			
			CU	S	47.000	CQC			JS16/S	21-OCT-93		46.2	UGG			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	HWKA		NI	S	4.900	CQC			JS16/S	21-OCT-93		4.55	UGG			
			NI	S	46.700	CQC			JS16/S	21-OCT-93		43.8	UGG			
			NI	S	47.000	CQC			JS16/S	21-OCT-93		45.3	UGG			
			TL	S	9.800	CQC			JS16/S	21-OCT-93		9.99	UGG			
			TL	S	93.300	CQC			JS16/S	21-OCT-93		97.3	UGG			
			TL	S	93.900	CQC			JS16/S	21-OCT-93		96.7	UGG			
			ZN	S	9.800	CQC			JS16/S	21-OCT-93		10.4	UGG			
			ZN	S	93.300	CQC			JS16/S	21-OCT-93		88.5	UGG			
			ZN	S	93.900	CQC			JS16/S	21-OCT-93		90.1	UGG			
ES	HWRA		AG	S	.756	CQC			JS16/S	15-NOV-93		.738	UGG			
			AG	S	7.830	CQC			JS16/S	15-NOV-93		7.53	UGG			
			AG	S	7.850	CQC			JS16/S	15-NOV-93		7.55	UGG			
			BE	S	4.720	CQC			JS16/S	15-NOV-93		4.69	UGG			
			BE	S	48.900	CQC			JS16/S	15-NOV-93		48.5	UGG			
			BE	S	49.100	CQC			JS16/S	15-NOV-93		48.4	UGG			
			CD	S	4.720	CQC			JS16/S	15-NOV-93		4.65	UGG			
			CD	S	48.900	CQC			JS16/S	15-NOV-93		47.1	UGG			
			CD	S	49.100	CQC			JS16/S	15-NOV-93		46.8	UGG			
			CR	S	9.450	CQC			JS16/S	15-NOV-93		9.82	UGG			
			CR	S	97.900	CQC			JS16/S	15-NOV-93		94.1	UGG			
			CR	S	98.200	CQC			JS16/S	15-NOV-93		93.8	UGG			
			CU	S	4.720	CQC			JS16/S	15-NOV-93		4.56	UGG			
			CU	S	48.900	CQC			JS16/S	15-NOV-93		46.7	UGG			
			CU	S	49.100	CQC			JS16/S	15-NOV-93		46.5	UGG			
			NI	S	4.720	CQC			JS16/S	15-NOV-93		5.12	UGG			
			NI	S	48.900	CQC			JS16/S	15-NOV-93		47	UGG			
			NI	S	49.100	CQC			JS16/S	15-NOV-93		46.1	UGG			
			TL	S	9.450	CQC			JS16/S	15-NOV-93		8.94	UGG			
			TL	S	97.900	CQC			JS16/S	15-NOV-93		94.4	UGG			
			TL	S	98.200	CQC			JS16/S	15-NOV-93		91.9	UGG			
			ZN	S	9.450	CQC			JS16/S	15-NOV-93		9.78	UGG			
			ZN	S	97.900	CQC			JS16/S	15-NOV-93		94.6	UGG			
			ZN	S	98.200	CQC			JS16/S	15-NOV-93		94	UGG			
ES	HWSA		AG	S	.799	CQC			JS16/S	16-NOV-93		.679	UGG			
			AG	S	7.950	CQC			JS16/S	16-NOV-93		7.58	UGG			
			AG	S	7.990	CQC			JS16/S	16-NOV-93		7.42	UGG			
			BE	S	4.990	CQC			JS16/S	16-NOV-93		5.09	UGG			
			BE	S	49.700	CQC			JS16/S	16-NOV-93		46.6	UGG			
			BE	S	49.900	CQC			JS16/S	16-NOV-93		47.2	UGG			
			CD	S	4.990	CQC			JS16/S	16-NOV-93		4.89	UGG			
			CD	S	49.700	CQC			JS16/S	16-NOV-93		46.2	UGG			
			CD	S	49.900	CQC			JS16/S	16-NOV-93		46	UGG			
			CR	S	9.990	CQC			JS16/S	16-NOV-93		9.48	UGG			
			CR	S	99.400	CQC			JS16/S	16-NOV-93		90.5	UGG			
			CR	S	99.900	CQC			JS16/S	16-NOV-93		90.8	UGG			
			CU	S	4.990	CQC			JS16/S	16-NOV-93		4.82	UGG			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	HWSA		CU	S	49.700	CQC			JS16/S	16-NOV-93		45.4	UGG			
			CU	S	49.900	CQC			JS16/S	16-NOV-93		46.1	UGG			
			NI	S	4.990	CQC			JS16/S	16-NOV-93		5.54	UGG			
			NI	S	49.700	CQC			JS16/S	16-NOV-93		46.2	UGG			
			NI	S	49.900	CQC			JS16/S	16-NOV-93		45.4	UGG			
			TL	S	9.990	CQC			JS16/S	16-NOV-93		12.1	UGG			
			TL	S	99.400	CQC			JS16/S	16-NOV-93		100	UGG			
			TL	S	99.900	CQC			JS16/S	16-NOV-93		99.8	UGG			
			ZN	S	9.990	CQC			JS16/S	16-NOV-93		12.6	UGG			
			ZN	S	99.400	CQC			JS16/S	16-NOV-93		92.9	UGG			
			ZN	S	99.900	CQC			JS16/S	16-NOV-93		92.3	UGG			
ES	HWTA		AG	S	.792	CQC			JS16/S	16-NOV-93		.737	UGG			
			AG	S	7.860	CQC			JS16/S	16-NOV-93		7.56	UGG			
			AG	S	7.910	CQC			JS16/S	16-NOV-93		7.53	UGG			
			BE	S	4.950	CQC			JS16/S	16-NOV-93		5.1	UGG			
			BE	S	49.100	CQC			JS16/S	16-NOV-93		50	UGG			
			BE	S	49.400	CQC			JS16/S	16-NOV-93		49.1	UGG			
			CD	S	4.950	CQC			JS16/S	16-NOV-93		4.65	UGG			
			CD	S	49.100	CQC			JS16/S	16-NOV-93		46.6	UGG			
			CD	S	49.400	CQC			JS16/S	16-NOV-93		46.3	UGG			
			CR	S	9.910	CQC			JS16/S	16-NOV-93		10.3	UGG			
			CR	S	98.300	CQC			JS16/S	16-NOV-93		95.3	UGG			
			CR	S	98.900	CQC			JS16/S	16-NOV-93		94.1	UGG			
			CU	S	4.950	CQC			JS16/S	16-NOV-93		5.07	UGG			
			CU	S	49.100	CQC			JS16/S	16-NOV-93		48	UGG			
			CU	S	49.400	CQC			JS16/S	16-NOV-93		47.3	UGG			
			NI	S	4.950	CQC			JS16/S	16-NOV-93		5.61	UGG			
			NI	S	49.100	CQC			JS16/S	16-NOV-93		47.7	UGG			
			NI	S	49.400	CQC			JS16/S	16-NOV-93		47.1	UGG			
			TL	S	9.910	CQC			JS16/S	16-NOV-93		10.7	UGG			
			TL	S	98.300	CQC			JS16/S	16-NOV-93		96.3	UGG			
			TL	S	98.900	CQC			JS16/S	16-NOV-93		96.8	UGG			
			ZN	S	9.910	CQC			JS16/S	16-NOV-93		10.3	UGG			
			ZN	S	98.300	CQC			JS16/S	16-NOV-93		93.1	UGG			
			ZN	S	98.900	CQC			JS16/S	16-NOV-93		92.4	UGG			
ES	HXKA		BA	S	10.000	CQC			SS10/W	19-OCT-93		11	UGL			
			BA	S	3750.000	CQC			SS10/W	19-OCT-93		3670	UGL			
			BA	S	7500.000	CQC			SS10/W	19-OCT-93		7250	UGL			
			BA	S	7500.000	CQC			SS10/W	19-OCT-93		7320	UGL			
			CA	S	1000.000	CQC			SS10/W	19-OCT-93		1120	UGL			
			CA	S	7500.000	CQC			SS10/W	19-OCT-93		7410	UGL			
			CA	S	15000.000	CQC			SS10/W	19-OCT-93		14700	UGL			
			CA	S	15000.000	CQC			SS10/W	19-OCT-93		14900	UGL			
			CD	S	15.000	CQC			SS10/W	19-OCT-93		15.5	UGL			
			CD	S	2000.000	CQC			SS10/W	19-OCT-93		1950	UGL			
			CD	S	4000.000	CQC			SS10/W	19-OCT-93		3890	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Measurement Unit	Flag Codes	Data Quals	Prog
ES	HXKA		CD	S	4000.000	CQC			SS10/W	19-OCT-93		3960	UGL			
			CO	S	50.000	CQC			SS10/W	19-OCT-93		50.4	UGL			
			CO	S	20000.000	CQC			SS10/W	19-OCT-93		19000	UGL			
			CO	S	40000.000	CQC			SS10/W	19-OCT-93		37700	UGL			
			CO	S	40000.000	CQC			SS10/W	19-OCT-93		38100	UGL			
			CR	S	10.000	CQC			SS10/W	19-OCT-93		11.8	UGL			
			CR	S	2000.000	CQC			SS10/W	19-OCT-93		1920	UGL			
			CR	S	4000.000	CQC			SS10/W	19-OCT-93		3810	UGL			
			CR	S	4000.000	CQC			SS10/W	19-OCT-93		3850	UGL			
			CU	S	20.000	CQC			SS10/W	19-OCT-93		20.4	UGL			
			CU	S	4000.000	CQC			SS10/W	19-OCT-93		3830	UGL			
			CU	S	8000.000	CQC			SS10/W	19-OCT-93		7620	UGL			
			CU	S	8000.000	CQC			SS10/W	19-OCT-93		7730	UGL			
			MG	S	1000.000	CQC			SS10/W	19-OCT-93		1010	UGL			
			MG	S	7500.000	CQC			SS10/W	19-OCT-93		7250	UGL			
			MG	S	15000.000	CQC			SS10/W	19-OCT-93		14500	UGL			
			MG	S	15000.000	CQC			SS10/W	19-OCT-93		14700	UGL			
			MN	S	10.000	CQC			SS10/W	19-OCT-93		10.7	UGL			
			MN	S	750.000	CQC			SS10/W	19-OCT-93		720	UGL			
			MN	S	1500.000	CQC			SS10/W	19-OCT-93		1430	UGL			
			MN	S	1500.000	CQC			SS10/W	19-OCT-93		1440	UGL			
			NA	S	1000.000	CQC			SS10/W	19-OCT-93		1140	UGL			
			NA	S	20000.000	CQC			SS10/W	19-OCT-93		19500	UGL			
			NA	S	40000.000	CQC			SS10/W	19-OCT-93		38500	UGL			
			NA	S	40000.000	CQC			SS10/W	19-OCT-93		38900	UGL			
			NI	S	50.000	CQC			SS10/W	19-OCT-93		48.9	UGL			
			NI	S	6000.000	CQC			SS10/W	19-OCT-93		5760	UGL			
			NI	S	12000.000	CQC			SS10/W	19-OCT-93		11400	UGL			
			NI	S	12000.000	CQC			SS10/W	19-OCT-93		11500	UGL			
			ZN	S	40.000	CQC			SS10/W	19-OCT-93		42.5	UGL			
			ZN	S	7500.000	CQC			SS10/W	19-OCT-93		6920	UGL			
			ZN	S	15000.000	CQC			SS10/W	19-OCT-93		13700	UGL			
			ZN	S	15000.000	CQC			SS10/W	19-OCT-93		13900	UGL			
ES	HXMA		BA	S	10.000	CQC			SS10/W	01-NOV-93		10.9	UGL			
			BA	S	3750.000	CQC			SS10/W	01-NOV-93		3700	UGL			
			BA	S	7500.000	CQC			SS10/W	01-NOV-93		7440	UGL			
			BA	S	7500.000	CQC			SS10/W	01-NOV-93		7420	UGL			
			CA	S	1000.000	CQC			SS10/W	01-NOV-93		1020	UGL			
			CA	S	7500.000	CQC			SS10/W	01-NOV-93		7460	UGL			
			CA	S	15000.000	CQC			SS10/W	01-NOV-93		15000	UGL			
			CA	S	15000.000	CQC			SS10/W	01-NOV-93		15000	UGL			
			CD	S	15.000	CQC			SS10/W	01-NOV-93		14	UGL			
			CD	S	2000.000	CQC			SS10/W	01-NOV-93		1950	UGL			
			CD	S	4000.000	CQC			SS10/W	01-NOV-93		3970	UGL			
			CD	S	4000.000	CQC			SS10/W	01-NOV-93		3920	UGL			
			CO	S	50.000	CQC			SS10/W	01-NOV-93		46.8	UGL			
			CO	S	20000.000	CQC			SS10/W	01-NOV-93		19600	UGL			
			CO	S	40000.000	CQC			SS10/W	01-NOV-93		39500	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	HXMA		CO	S	40000.000	CQC			SS10/W	01-NOV-93		39500	UGL			
			CR	S	10.000	CQC			SS10/W	01-NOV-93		9.88	UGL			
			CR	S	2000.000	CQC			SS10/W	01-NOV-93		1950	UGL			
			CR	S	4000.000	CQC			SS10/W	01-NOV-93		3940	UGL			
			CR	S	4000.000	CQC			SS10/W	01-NOV-93		3930	UGL			
			CU	S	20.000	CQC			SS10/W	01-NOV-93		20.5	UGL			
			CU	S	4000.000	CQC			SS10/W	01-NOV-93		3880	UGL			
			CU	S	8000.000	CQC			SS10/W	01-NOV-93		7860	UGL			
			CU	S	8000.000	CQC			SS10/W	01-NOV-93		7860	UGL			
			MG	S	1000.000	CQC			SS10/W	01-NOV-93		943	UGL			
			MG	S	7500.000	CQC			SS10/W	01-NOV-93		7360	UGL			
			MG	S	15000.000	CQC			SS10/W	01-NOV-93		14800	UGL			
			MG	S	15000.000	CQC			SS10/W	01-NOV-93		14800	UGL			
			MN	S	10.000	CQC			SS10/W	01-NOV-93		10.7	UGL			
			MN	S	750.000	CQC			SS10/W	01-NOV-93		742	UGL			
			MN	S	1500.000	CQC			SS10/W	01-NOV-93		1490	UGL			
			MN	S	1500.000	CQC			SS10/W	01-NOV-93		1490	UGL			
			NA	S	1000.000	CQC			SS10/W	01-NOV-93		1050	UGL			
			NA	S	20000.000	CQC			SS10/W	01-NOV-93		19800	UGL			
			NA	S	40000.000	CQC			SS10/W	01-NOV-93		39700	UGL			
			NA	S	40000.000	CQC			SS10/W	01-NOV-93		39700	UGL			
			NI	S	50.000	CQC			SS10/W	01-NOV-93		51.1	UGL			
			NI	S	6000.000	CQC			SS10/W	01-NOV-93		5720	UGL			
			NI	S	12000.000	CQC			SS10/W	01-NOV-93		11500	UGL			
			NI	S	12000.000	CQC			SS10/W	01-NOV-93		11400	UGL			
			ZN	S	40.000	CQC			SS10/W	01-NOV-93		40.1	UGL			
			ZN	S	7500.000	CQC			SS10/W	01-NOV-93		7360	UGL			
			ZN	S	15000.000	CQC			SS10/W	01-NOV-93		14800	UGL			
			ZN	S	15000.000	CQC			SS10/W	01-NOV-93		14700	UGL			
ES	HZZA		246TBP	S	6.700	CQC			LM18/S	28-OCT-93		5.6	UGG			
			2FBP	S	3.300	CQC			LM18/S	28-OCT-93		2.6	UGG			
			2FP	S	6.700	CQC			LM18/S	28-OCT-93		5.7	UGG			
			NBD5	S	3.300	CQC			LM18/S	28-OCT-93		2.8	UGG			
			PHEND6	S	6.700	CQC			LM18/S	28-OCT-93		5.2	UGG			
			TRPD14	S	3.300	CQC			LM18/S	28-OCT-93		3.1	UGG			
			UNK633	S	3.300	CQC			LM18/S	28-OCT-93		4	UGG	S		
ES	IAIA		AENSLF	S	.020	CQC			LH10/S	09-NOV-93		1.63 E -2	UGG			
			AENSLF	S	.020	CQC			LH10/S	11-NOV-93		1.74 E -2	UGG			
			ALDRN	S	.020	CQC			LH10/S	09-NOV-93		1.63 E -2	UGG			
			ALDRN	S	.020	CQC			LH10/S	11-NOV-93		1.53 E -2	UGG			
			BENSLF	S	.020	CQC			LH10/S	09-NOV-93		1.62 E -2	UGG			
			BENSLF	S	.020	CQC			LH10/S	11-NOV-93		1.50 E -2	UGG			
			CL10BP	S	.067	CQC			LH10/S	09-NOV-93		5.40 E -2	UGG	Z		
			CL10BP	S	.067	CQC			LH10/S	11-NOV-93		5.00 E -2	UGG	Z		
			CL10BP	S	.067	CQC			LH10/S	11-NOV-93		5.20 E -2	UGG	Z		
			CL10BP	S	.067	CQC			LH10/S	09-NOV-93		5.70 E -2	UGG	Z		

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	IAIA		CL4XYL	S	.067	CQC			LH10/S	09-NOV-93		4.69 E -2	UGG	Z		
			CL4XYL	S	.067	CQC			LH10/S	11-NOV-93		5.16 E -2	UGG	Z		
			CL4XYL	S	.067	CQC			LH10/S	11-NOV-93		4.60 E -2	UGG	Z		
			CL4XYL	S	.067	CQC			LH10/S	09-NOV-93		5.18 E -2	UGG	Z		
			DLDRN	S	.020	CQC			LH10/S	09-NOV-93		1.68 E -2	UGG			
			DLDRN	S	.020	CQC			LH10/S	11-NOV-93		1.47 E -2	UGG			
			ENDRN	S	.020	CQC			LH10/S	09-NOV-93		1.68 E -2	UGG			
			ENDRN	S	.020	CQC			LH10/S	11-NOV-93		1.47 E -2	UGG			
			HPCL	S	.020	CQC			LH10/S	09-NOV-93		1.59 E -2	UGG			
			HPCL	S	.020	CQC			LH10/S	11-NOV-93		1.47 E -2	UGG			
			ISODR	S	.030	CQC			LH10/S	09-NOV-93		2.41 E -2	UGG			
			ISODR	S	.030	CQC			LH10/S	11-NOV-93		2.29 E -2	UGG			
			LIN	S	.020	CQC			LH10/S	09-NOV-93		1.30 E -2	UGG			
			LIN	S	.020	CQC			LH10/S	11-NOV-93		1.17 E -2	UGG			
			MEXCLR	S	.200	CQC			LH10/S	09-NOV-93		.173	UGG			
			MEXCLR	S	.200	CQC			LH10/S	11-NOV-93		.163	UGG			
			PPDDT	S	.020	CQC			LH10/S	09-NOV-93		1.54 E -2	UGG			
			PPDDT	S	.020	CQC			LH10/S	11-NOV-93		1.30 E -2	UGG			
ES	IAJA		AENSLF	S	.020	CQC			LH10/S	06-NOV-93		1.66 E -2	UGG			
			ALDRN	S	.020	CQC			LH10/S	06-NOV-93		1.63 E -2	UGG			
			BENSLF	S	.020	CQC			LH10/S	06-NOV-93		1.71 E -2	UGG			
			CL10BP	S	.067	CQC			LH10/S	06-NOV-93		6.20 E -2	UGG	Z		
			CL10BP	S	.067	CQC			LH10/S	06-NOV-93		6.10 E -2	UGG	Z		
			CL4XYL	S	.067	CQC			LH10/S	06-NOV-93		5.95 E -2	UGG	Z		
			CL4XYL	S	.067	CQC			LH10/S	06-NOV-93		5.62 E -2	UGG	Z		
			DLDRN	S	.020	CQC			LH10/S	06-NOV-93		1.73 E -2	UGG			
			ENDRN	S	.020	CQC			LH10/S	06-NOV-93		1.89 E -2	UGG			
			HPCL	S	.020	CQC			LH10/S	06-NOV-93		1.60 E -2	UGG			
			ISODR	S	.030	CQC			LH10/S	06-NOV-93		2.35 E -2	UGG			
			LIN	S	.020	CQC			LH10/S	06-NOV-93		1.38 E -2	UGG			
			MEXCLR	S	.200	CQC			LH10/S	06-NOV-93		.222	UGG			
			PPDDT	S	.020	CQC			LH10/S	06-NOV-93		1.69 E -2	UGG			
ES	IAKA		AENSLF	S	.020	CQC			LH10/S	10-NOV-93		1.56 E -2	UGG			
			ALDRN	S	.020	CQC			LH10/S	10-NOV-93		1.62 E -2	UGG			
			BENSLF	S	.020	CQC			LH10/S	10-NOV-93		1.46 E -2	UGG			
			CL10BP	S	.067	CQC			LH10/S	10-NOV-93		4.80 E -2	UGG	Z		
			CL10BP	S	.067	CQC			LH10/S	10-NOV-93		4.90 E -2	UGG	Z		
			CL4XYL	S	.067	CQC			LH10/S	10-NOV-93		5.52 E -2	UGG	Z		
			CL4XYL	S	.067	CQC			LH10/S	10-NOV-93		5.28 E -2	UGG	Z		
			DLDRN	S	.020	CQC			LH10/S	10-NOV-93		1.57 E -2	UGG			
			ENDRN	S	.020	CQC			LH10/S	10-NOV-93		1.74 E -2	UGG			
			HPCL	S	.020	CQC			LH10/S	10-NOV-93		1.59 E -2	UGG			
			ISODR	S	.030	CQC			LH10/S	10-NOV-93		2.23 E -2	UGG			
			LIN	S	.020	CQC			LH10/S	10-NOV-93		1.25 E -2	UGG			
			MEXCLR	S	.200	CQC			LH10/S	10-NOV-93		.172	UGG			
			PPDDT	S	.020	CQC			LH10/S	10-NOV-93		1.45 E -2	UGG			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	IAKA															
ES	IEGA		HG	S	.500	CQC			SB01/W	18-OCT-93		.515	UGL			
			HG	S	2.500	CQC			SB01/W	18-OCT-93		2.57	UGL			
			HG	S	2.500	CQC			SB01/W	18-OCT-93		2.54	UGL			
ES	IEIA		HG	S	.500	CQC			SB01/W	04-NOV-93		.51	UGL			
			HG	S	2.500	CQC			SB01/W	04-NOV-93		2.45	UGL			
			HG	S	2.500	CQC			SB01/W	04-NOV-93		2.24	UGL			
ES	IFMA		246TBP	S	100.000	CQC			UM18/W	29-OCT-93		66	UGL			
			2FBP	S	50.000	CQC			UM18/W	29-OCT-93		31	UGL			
			2FP	S	100.000	CQC			UM18/W	29-OCT-93		54	UGL			
			NBD5	S	50.000	CQC			UM18/W	29-OCT-93		30	UGL			
			PHEND6	S	100.000	CQC			UM18/W	29-OCT-93		40	UGL			
			TRPD14	S	50.000	CQC			UM18/W	29-OCT-93		40	UGL			
			UNK541	S	5.000	CQC			UM18/W	29-OCT-93		5	UGL	S		
ES	IFTA		246TBP	S	100.000	CQC			UM18/W	12-NOV-93		84	UGL			
			2FBP	S	50.000	CQC			UM18/W	12-NOV-93		31	UGL			
			2FP	S	100.000	CQC			UM18/W	12-NOV-93		57	UGL			
			NBD5	S	50.000	CQC			UM18/W	12-NOV-93		29	UGL			
			PHEND6	S	100.000	CQC			UM18/W	12-NOV-93		39	UGL			
			TRPD14	S	50.000	CQC			UM18/W	12-NOV-93		41	UGL			
ES	IGNA		135TNB	S	1.140	CQC			LW12/S	08-NOV-93		.848	UGG			
			135TNB	S	9.140	CQC			LW12/S	08-NOV-93		7.86	UGG			
			135TNB	S	9.140	CQC			LW12/S	08-NOV-93		6.63	UGG			
			246TNT	S	1.140	CQC			LW12/S	08-NOV-93		.885	UGG			
			246TNT	S	9.120	CQC			LW12/S	08-NOV-93		7.13	UGG			
			246TNT	S	9.120	CQC			LW12/S	08-NOV-93		6.82	UGG			
			24DNT	S	1.230	CQC			LW12/S	08-NOV-93		.952	UGG			
			24DNT	S	9.810	CQC			LW12/S	08-NOV-93		8.61	UGG			
			24DNT	S	9.810	CQC			LW12/S	08-NOV-93		8.55	UGG			
			2NT	S	.539	CQC			LW12/S	08-NOV-93		.354	UGG			
			2NT	S	22.500	CQC			LW12/S	08-NOV-93		21.5	UGG			
			2NT	S	22.500	CQC			LW12/S	08-NOV-93		21.9	UGG			
			2NT	S	44.900	CQC			LW12/S	08-NOV-93		44.1	UGG			
			NB	S	3.000	CQC			LW12/S	08-NOV-93		2.92	UGG			
			NB	S	24.000	CQC			LW12/S	08-NOV-93		23.7	UGG			
			NB	S	24.000	CQC			LW12/S	08-NOV-93		24.2	UGG			
			NG	S	10.000	CQC			LW12/S	08-NOV-93		8.86	UGG			
			NG	S	40.000	CQC			LW12/S	08-NOV-93		39	UGG			
			NG	S	40.000	CQC			LW12/S	08-NOV-93		40.6	UGG			
			PETN	S	9.530	CQC			LW12/S	08-NOV-93		9.1	UGG			
			PETN	S	38.100	CQC			LW12/S	08-NOV-93		35.5	UGG			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Measurement Unit	Flag Codes	Data Quals	Prog
ES	IGNA		PETN	S	38.100	CQC			LW12/S	08-NOV-93		36.4	UGG			
			RDX	S	1.070	CQC			LW12/S	08-NOV-93		.923	UGG			
			RDX	S	8.600	CQC			LW12/S	08-NOV-93		7.9	UGG			
			RDX	S	8.600	CQC			LW12/S	08-NOV-93		8.31	UGG			
ES	IGSA		135TNB	S	1.140	CQC			LW12/S	13-NOV-93		.937	UGG			
			135TNB	S	9.140	CQC			LW12/S	13-NOV-93		7.42	UGG			
			135TNB	S	9.140	CQC			LW12/S	13-NOV-93		7.77	UGG			
			246TNT	S	1.140	CQC			LW12/S	13-NOV-93		1.02	UGG			
			246TNT	S	9.120	CQC			LW12/S	13-NOV-93		7.87	UGG			
			246TNT	S	9.120	CQC			LW12/S	13-NOV-93		8	UGG			
			24DNT	S	1.230	CQC			LW12/S	13-NOV-93		1.01	UGG			
			24DNT	S	9.810	CQC			LW12/S	13-NOV-93		8.78	UGG			
			24DNT	S	9.810	CQC			LW12/S	13-NOV-93		8.88	UGG			
			2NT	S	.539	CQC			LW12/S	13-NOV-93		.362	UGG			
			2NT	S	22.500	CQC			LW12/S	13-NOV-93		22.1	UGG			
			2NT	S	22.500	CQC			LW12/S	13-NOV-93		22	UGG			
			2NT	S	45.000	CQC			LW12/S	13-NOV-93		44.1	UGG			
			NB	S	3.000	CQC			LW12/S	13-NOV-93		2.99	UGG			
			NB	S	24.000	CQC			LW12/S	13-NOV-93		24.8	UGG			
			NB	S	24.000	CQC			LW12/S	13-NOV-93		25.1	UGG			
			NG	S	10.000	CQC			LW12/S	13-NOV-93		9.67	UGG			
			NG	S	40.000	CQC			LW12/S	13-NOV-93		41.8	UGG			
			NG	S	40.000	CQC			LW12/S	13-NOV-93		41.1	UGG			
			PETN	S	9.530	CQC			LW12/S	13-NOV-93		8.16	UGG			
			PETN	S	38.100	CQC			LW12/S	13-NOV-93		37.7	UGG			
			PETN	S	38.100	CQC			LW12/S	13-NOV-93		38.4	UGG			
			RDX	S	1.070	CQC			LW12/S	13-NOV-93		.98	UGG			
			RDX	S	8.600	CQC			LW12/S	13-NOV-93		8.09	UGG			
			RDX	S	8.600	CQC			LW12/S	13-NOV-93		8.15	UGG			
ES	IGTA		135TNB	S	1.140	CQC			LW12/S	15-NOV-93		1	UGG			
			135TNB	S	9.140	CQC			LW12/S	15-NOV-93		8.22	UGG			
			135TNB	S	9.140	CQC			LW12/S	15-NOV-93		7.5	UGG			
			246TNT	S	1.140	CQC			LW12/S	15-NOV-93		1.11	UGG			
			246TNT	S	9.120	CQC			LW12/S	15-NOV-93		8.59	UGG			
			246TNT	S	9.120	CQC			LW12/S	15-NOV-93		8.39	UGG			
			24DNT	S	1.230	CQC			LW12/S	15-NOV-93		1.05	UGG			
			24DNT	S	9.810	CQC			LW12/S	15-NOV-93		9.6	UGG			
			24DNT	S	9.810	CQC			LW12/S	15-NOV-93		9.39	UGG			
			2NT	S	.539	CQC			LW12/S	15-NOV-93		.387	UGG		J	
			2NT	S	22.500	CQC			LW12/S	15-NOV-93		19	UGG		J	
			2NT	S	22.500	CQC			LW12/S	15-NOV-93		19.2	UGG		J	
			2NT	S	45.000	CQC			LW12/S	15-NOV-93		38.2	UGG		J	
			NB	S	3.000	CQC			LW12/S	15-NOV-93		3.21	UGG			
			NB	S	24.000	CQC			LW12/S	15-NOV-93		26.9	UGG			
			NB	S	24.000	CQC			LW12/S	15-NOV-93		26.9	UGG			
			NG	S	10.000	CQC			LW12/S	15-NOV-93		9.08	UGG			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	IGTA		NG	S	40.000	CQC			LW12/S	15-NOV-93		43.3	UGG			
			NG	S	40.000	CQC			LW12/S	15-NOV-93		42.3	UGG			
			PETN	S	9.530	CQC			LW12/S	15-NOV-93		8.46	UGG			
			PETN	S	38.100	CQC			LW12/S	15-NOV-93		37.5	UGG			
			PETN	S	38.100	CQC			LW12/S	15-NOV-93		37.3	UGG			
			RDX	S	1.070	CQC			LW12/S	15-NOV-93		.937	UGG			
			RDX	S	8.600	CQC			LW12/S	15-NOV-93		8.42	UGG			
			RDX	S	8.600	CQC			LW12/S	15-NOV-93		8.53	UGG			
ES	IGYA		135TNB	S	1.140	CQC			LW12/S	22-NOV-93		1.12	UGG			
			135TNB	S	9.140	CQC			LW12/S	22-NOV-93		8.93	UGG			
			135TNB	S	9.140	CQC			LW12/S	22-NOV-93		9.01	UGG			
			246TNT	S	1.140	CQC			LW12/S	22-NOV-93		1.12	UGG			
			246TNT	S	9.120	CQC			LW12/S	22-NOV-93		8.73	UGG			
			246TNT	S	9.120	CQC			LW12/S	22-NOV-93		8.78	UGG			
			24DNT	S	1.230	CQC			LW12/S	22-NOV-93		1.14	UGG			
			24DNT	S	9.810	CQC			LW12/S	22-NOV-93		8.92	UGG			
			24DNT	S	9.810	CQC			LW12/S	22-NOV-93		9.24	UGG			
			2NT	S	.539	CQC			LW12/S	22-NOV-93		.524	UGG			
			2NT	S	22.500	CQC			LW12/S	22-NOV-93		18.4	UGG			
			2NT	S	22.500	CQC			LW12/S	22-NOV-93		18.8	UGG			
			2NT	S	45.000	CQC			LW12/S	22-NOV-93		37.1	UGG			
			NB	S	3.000	CQC			LW12/S	22-NOV-93		3.12	UGG			
			NB	S	24.000	CQC			LW12/S	22-NOV-93		25.7	UGG			
			NB	S	24.000	CQC			LW12/S	22-NOV-93		26.2	UGG			
			NG	S	10.000	CQC			LW12/S	22-NOV-93		10.3	UGG			
			NG	S	40.000	CQC			LW12/S	22-NOV-93		41.8	UGG			
			NG	S	40.000	CQC			LW12/S	22-NOV-93		41.6	UGG			
			PETN	S	9.530	CQC			LW12/S	22-NOV-93		9.35	UGG			
			PETN	S	38.100	CQC			LW12/S	22-NOV-93		39.6	UGG			
			PETN	S	38.100	CQC			LW12/S	22-NOV-93		40	UGG			
			RDX	S	1.070	CQC			LW12/S	22-NOV-93		1.02	UGG			
			RDX	S	8.600	CQC			LW12/S	22-NOV-93		8.32	UGG			
			RDX	S	8.600	CQC			LW12/S	22-NOV-93		8.49	UGG			
ES	IGZA		135TNB	S	1.140	CQC			LW12/S	23-NOV-93		.245	UGG	1	JR	
			135TNB	S	9.140	CQC			LW12/S	23-NOV-93		9.17	UGG		JR	
			135TNB	S	9.140	CQC			LW12/S	23-NOV-93		8.9	UGG		JR	
			246TNT	S	1.140	CQC			LW12/S	23-NOV-93		1.09	UGG			
			246TNT	S	9.120	CQC			LW12/S	23-NOV-93		8.85	UGG			
			246TNT	S	9.120	CQC			LW12/S	23-NOV-93		8.89	UGG			
			24DNT	S	1.230	CQC			LW12/S	23-NOV-93		1.18	UGG			
			24DNT	S	9.810	CQC			LW12/S	23-NOV-93		9.15	UGG			
			24DNT	S	9.810	CQC			LW12/S	23-NOV-93		9.17	UGG			
			2NT	S	.539	CQC			LW12/S	23-NOV-93		.606	UGG			
			2NT	S	22.500	CQC			LW12/S	23-NOV-93		18.8	UGG			
			2NT	S	22.500	CQC			LW12/S	23-NOV-93		18.7	UGG			
			2NT	S	45.000	CQC			LW12/S	23-NOV-93		36.7	UGG			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	ID	Meth/ Matrix	Analysis Date	Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	IGZA		NB	S	3.000	CQC			LW12/S	23-NOV-93		3.33	UGG			
			NB	S	24.000	CQC			LW12/S	23-NOV-93		25.7	UGG			
			NB	S	24.000	CQC			LW12/S	23-NOV-93		25.9	UGG			
			NG	S	10.000	CQC			LW12/S	23-NOV-93		10.7	UGG			
			NG	S	40.000	CQC			LW12/S	23-NOV-93		42.3	UGG			
			NG	S	40.000	CQC			LW12/S	23-NOV-93		42.6	UGG			
			PETN	S	9.530	CQC			LW12/S	23-NOV-93		9.14	UGG			
			PETN	S	38.100	CQC			LW12/S	23-NOV-93		39.9	UGG			
			PETN	S	38.100	CQC			LW12/S	23-NOV-93		38.9	UGG			
			RDX	S	1.070	CQC			LW12/S	23-NOV-93		1.29	UGG			
			RDX	S	8.600	CQC			LW12/S	23-NOV-93		8.3	UGG			
			RDX	S	8.600	CQC			LW12/S	23-NOV-93		8.36	UGG			
ES	INIA		PB	S	10.000	CQC			SD20/W	10-NOV-93		11.4	UGL			
			PB	S	80.000	CQC			SD20/W	10-NOV-93		82.5	UGL			
			PB	S	80.000	CQC			SD20/W	10-NOV-93		79.9	UGL			
ES	IPIA		AENSLF	S	.500	CQC			UH13/W	01-NOV-93		.42	UGL			
			ALDRN	S	.500	CQC			UH13/W	01-NOV-93		.358	UGL			
			BENSLF	S	.500	CQC			UH13/W	01-NOV-93		.487	UGL			
			CL10BP	S	1.250	CQC			UH13/W	01-NOV-93		1	UGL	Z		
			CL10BP	S	1.250	CQC			UH13/W	01-NOV-93		1.1	UGL	Z		
			CL4XYL	S	1.250	CQC			UH13/W	01-NOV-93		.806	UGL	Z		
			CL4XYL	S	1.250	CQC			UH13/W	01-NOV-93		.829	UGL	Z		
			DLDRN	S	.500	CQC			UH13/W	01-NOV-93		.451	UGL			
			ENDRN	S	.500	CQC			UH13/W	01-NOV-93		.516	UGL			
			HPCL	S	.500	CQC			UH13/W	01-NOV-93		.372	UGL			
			ISODR	S	1.000	CQC			UH13/W	01-NOV-93		.706	UGL			
			LIN	S	.500	CQC			UH13/W	01-NOV-93		.335	UGL			
			MEXCLR	S	1.000	CQC			UH13/W	01-NOV-93		1.09	UGL			
			PPDDT	S	.500	CQC			UH13/W	01-NOV-93		.394	UGL			
ES	IRLA		TPHDSL	S	20600.000	CQC			8015/W	04-NOV-93		16000	UGL		Q	
			TPHGAS	S	20300.000	CQC			8015/W	04-NOV-93		14000	UGL		Q	
ES	IROA		TPHDSL	S	412.000	CQC			00 /S	05-NOV-93		400	UGG			
			TPHGAS	S	406.000	CQC			00 /S	05-NOV-93		340	UGG			
ES	ISCA		AS	S	.497	CQC			JD19/S	11-NOV-93		.666	UGG			
			AS	S	7.420	CQC			JD19/S	11-NOV-93		7.47	UGG			
			AS	S	7.470	CQC			JD19/S	11-NOV-93		7.37	UGG			
ES	ISEA		AS	S	.495	CQC			JD19/S	01-DEC-93		.653	UGG			
			AS	S	7.570	CQC			JD19/S	01-DEC-93		7.55	UGG			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	ID	Meth/ Matrix	Analysis Date	Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	ISEA		AS	S	7.840	CQC			JD19/S	01-DEC-93		7.85	UGG			
ES	ISFA		AS	S	.484	CQC			JD19/S	01-DEC-93		.588	UGG			
			AS	S	7.730	CQC			JD19/S	01-DEC-93		8.2	UGG			
			AS	S	7.810	CQC			JD19/S	01-DEC-93		8.23	UGG			
ES	ISGA		AS	S	.496	CQC			JD19/S	02-DEC-93		.465	UGG			
			AS	S	7.960	CQC			JD19/S	02-DEC-93		7.99	UGG			
			AS	S	7.980	CQC			JD19/S	02-DEC-93		7.95	UGG			
ES	IUMA		12DCD4	S	.050	CQC			LM19/S	29-OCT-93		5.2 E -2	UGG			
			4BFB	S	.050	CQC			LM19/S	29-OCT-93		5.1 E -2	UGG			
			MEC6D8	S	.050	CQC			LM19/S	29-OCT-93		5.0 E -2	UGG			
ES	IVLA		246TBP	S	6.700	CQC			LM18/S	25-OCT-93		3.7	UGG			
			2FBP	S	3.300	CQC			LM18/S	25-OCT-93		2.4	UGG			
			2FP	S	6.700	CQC			LM18/S	25-OCT-93		4.6	UGG			
			NBD5	S	3.300	CQC			LM18/S	25-OCT-93		2.2	UGG			
			PHEND6	S	6.700	CQC			LM18/S	25-OCT-93		4.6	UGG			
			TRPD14	S	3.300	CQC			LM18/S	25-OCT-93		1.7	UGG			
ES	IVWA		246TBP	S	6.700	CQC			LM18/S	29-NOV-93		5.4	UGG			
			2FBP	S	3.300	CQC			LM18/S	29-NOV-93		2.5	UGG			
			2FP	S	6.700	CQC			LM18/S	29-NOV-93		5.6	UGG			
			MESTOX	S	3.300	CQC			LM18/S	29-NOV-93		.2	UGG	S		
			NBD5	S	3.300	CQC			LM18/S	29-NOV-93		3.1	UGG			
			PHEND6	S	6.700	CQC			LM18/S	29-NOV-93		5.7	UGG			
			TRPD14	S	3.300	CQC			LM18/S	29-NOV-93		2.4	UGG			
ES	IZFA		12DCD4	S	50.000	CQC			UM20/W	31-OCT-93		48	UGL			
			4BFB	S	50.000	CQC			UM20/W	31-OCT-93		50	UGL			
			MEC6D8	S	50.000	CQC			UM20/W	31-OCT-93		48	UGL			
ES	JGIA		135TNB	S	.979	CQC			UW32/W	22-NOV-93		.834	UGL			
			135TNB	S	9.790	CQC			UW32/W	22-NOV-93		9.34	UGL			
			135TNB	S	9.790	CQC			UW32/W	22-NOV-93		9.58	UGL			
			135TNB	S	49.000	CQC			UW32/W	22-NOV-93		47.6	UGL			
			246TNT	S	1.350	CQC			UW32/W	22-NOV-93		1.23	UGL			
			246TNT	S	13.500	CQC			UW32/W	22-NOV-93		12.9	UGL			
			246TNT	S	13.500	CQC			UW32/W	22-NOV-93		13.1	UGL			
			246TNT	S	74.300	CQC			UW32/W	22-NOV-93		71.1	UGL			
			24DNT	S	.136	CQC			UW32/W	22-NOV-93		.108	UGL			
			24DNT	S	1.360	CQC			UW32/W	22-NOV-93		1.22	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	JGIA		24DNT	S	1.360	CQC			UW32/W	22-NOV-93		1.24	UGL			
			24DNT	S	18.200	CQC			UW32/W	22-NOV-93		17	UGL			
			2NT	S	.757	CQC			UW32/W	22-NOV-93		.625	UGL			
			2NT	S	7.570	CQC			UW32/W	22-NOV-93		6.33	UGL			
			2NT	S	7.570	CQC			UW32/W	22-NOV-93		6.49	UGL			
			2NT	S	90.800	CQC			UW32/W	22-NOV-93		83.6	UGL			
			34DNT	S	6.240	CQC			UW32/W	22-NOV-93		6.5	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	22-NOV-93		6.11	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	22-NOV-93		6.48	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	22-NOV-93		5.79	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	22-NOV-93		6.4	UGL	Z		
			NB	S	1.150	CQC			UW32/W	22-NOV-93		.881	UGL			
			NB	S	11.500	CQC			UW32/W	22-NOV-93		10.1	UGL			
			NB	S	11.500	CQC			UW32/W	22-NOV-93		10.2	UGL			
			NB	S	91.800	CQC			UW32/W	22-NOV-93		83.4	UGL			
			RDX	S	2.360	CQC			UW32/W	22-NOV-93		2.1	UGL			
			RDX	S	23.600	CQC			UW32/W	22-NOV-93		21.5	UGL			
			RDX	S	23.600	CQC			UW32/W	22-NOV-93		21.9	UGL			
			RDX	S	94.200	CQC			UW32/W	22-NOV-93		88.4	UGL			
ES	JGLA		135TNB	S	.979	CQC			UW32/W	22-NOV-93		.579	UGL		N	
			135TNB	S	9.790	CQC			UW32/W	22-NOV-93		7.15	UGL		N	
			135TNB	S	9.790	CQC			UW32/W	22-NOV-93		6.67	UGL		N	
			135TNB	S	49.000	CQC			UW32/W	22-NOV-93		43.3	UGL		N	
			246TNT	S	1.350	CQC			UW32/W	22-NOV-93		1.28	UGL			
			246TNT	S	13.500	CQC			UW32/W	22-NOV-93		12.3	UGL			
			246TNT	S	13.500	CQC			UW32/W	22-NOV-93		11.5	UGL			
			246TNT	S	74.300	CQC			UW32/W	22-NOV-93		67.4	UGL			
			24DNT	S	.136	CQC			UW32/W	22-NOV-93		.111	UGL			
			24DNT	S	1.360	CQC			UW32/W	22-NOV-93		1.2	UGL			
			24DNT	S	1.360	CQC			UW32/W	22-NOV-93		1.14	UGL			
			24DNT	S	18.200	CQC			UW32/W	22-NOV-93		16.9	UGL			
			2NT	S	.757	CQC			UW32/W	22-NOV-93		.637	UGL			
			2NT	S	7.570	CQC			UW32/W	22-NOV-93		6.31	UGL			
			2NT	S	7.570	CQC			UW32/W	22-NOV-93		6.37	UGL			
			2NT	S	90.800	CQC			UW32/W	22-NOV-93		74.4	UGL			
			34DNT	S	6.240	CQC			UW32/W	22-NOV-93		5.37	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	22-NOV-93		5.33	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	22-NOV-93		4.57	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	22-NOV-93		4.83	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	22-NOV-93		4.94	UGL	Z		
			NB	S	1.150	CQC			UW32/W	22-NOV-93		.952	UGL			
			NB	S	11.500	CQC			UW32/W	22-NOV-93		8.88	UGL			
			NB	S	11.500	CQC			UW32/W	22-NOV-93		9.1	UGL			
			NB	S	91.800	CQC			UW32/W	22-NOV-93		72.2	UGL			
			RDX	S	2.360	CQC			UW32/W	22-NOV-93		1.9	UGL			
			RDX	S	23.600	CQC			UW32/W	22-NOV-93		20	UGL			
			RDX	S	23.600	CQC			UW32/W	22-NOV-93		18.9	UGL			
			RDX	S	94.200	CQC			UW32/W	22-NOV-93		77.8	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Measurement Unit	Flag Codes	Data Quals	Prog
ES	JGLA															
ES	KBAA		135TNB	S	1.140	CQC			LW12/S	01-DEC-93		.944	UGG			
			135TNB	S	9.140	CQC			LW12/S	02-DEC-93		8.43	UGG			
			135TNB	S	9.140	CQC			LW12/S	02-DEC-93		7.19	UGG			
			246TNT	S	1.140	CQC			LW12/S	01-DEC-93		1.03	UGG			
			246TNT	S	9.120	CQC			LW12/S	02-DEC-93		8.2	UGG			
			246TNT	S	9.120	CQC			LW12/S	02-DEC-93		8.28	UGG			
			24DNT	S	1.230	CQC			LW12/S	01-DEC-93		1.08	UGG			
			24DNT	S	9.810	CQC			LW12/S	02-DEC-93		8.58	UGG			
			24DNT	S	9.810	CQC			LW12/S	02-DEC-93		8.58	UGG			
			2NT	S	.539	CQC			LW12/S	01-DEC-93		.584	UGG			
			2NT	S	22.500	CQC			LW12/S	02-DEC-93		17.4	UGG			
			2NT	S	22.500	CQC			LW12/S	02-DEC-93		17.8	UGG			
			2NT	S	45.000	CQC			LW12/S	02-DEC-93		35	UGG			
			NB	S	3.000	CQC			LW12/S	01-DEC-93		2.9	UGG			
			NB	S	24.000	CQC			LW12/S	02-DEC-93		24.2	UGG			
			NB	S	24.000	CQC			LW12/S	02-DEC-93		24.9	UGG			
			NG	S	10.000	CQC			LW12/S	01-DEC-93		9.67	UGG			
			NG	S	40.000	CQC			LW12/S	02-DEC-93		38.9	UGG			
			NG	S	40.000	CQC			LW12/S	02-DEC-93		41.2	UGG			
			PETN	S	9.530	CQC			LW12/S	01-DEC-93		8.98	UGG			
			PETN	S	38.100	CQC			LW12/S	02-DEC-93		36.8	UGG			
			PETN	S	38.100	CQC			LW12/S	02-DEC-93		38.4	UGG			
			RDX	S	1.070	CQC			LW12/S	01-DEC-93		.916	UGG			
			RDX	S	8.600	CQC			LW12/S	02-DEC-93		7.85	UGG			
			RDX	S	8.600	CQC			LW12/S	02-DEC-93		8.14	UGG			
ES	KBBA		135TNB	S	1.140	CQC			LW12/S	02-DEC-93		1.03	UGG			
			135TNB	S	9.140	CQC			LW12/S	02-DEC-93		6	UGG			
			135TNB	S	9.140	CQC			LW12/S	02-DEC-93		8.42	UGG			
			246TNT	S	1.140	CQC			LW12/S	02-DEC-93		1.06	UGG			
			246TNT	S	9.120	CQC			LW12/S	02-DEC-93		7.66	UGG			
			246TNT	S	9.120	CQC			LW12/S	02-DEC-93		8.23	UGG			
			24DNT	S	1.230	CQC			LW12/S	02-DEC-93		1.12	UGG			
			24DNT	S	9.810	CQC			LW12/S	02-DEC-93		8.67	UGG			
			24DNT	S	9.810	CQC			LW12/S	02-DEC-93		8.47	UGG			
			2NT	S	.539	CQC			LW12/S	02-DEC-93		.479	UGG			
			2NT	S	22.500	CQC			LW12/S	02-DEC-93		17.6	UGG			
			2NT	S	22.500	CQC			LW12/S	02-DEC-93		17.5	UGG			
			2NT	S	45.000	CQC			LW12/S	02-DEC-93		36	UGG			
			NB	S	3.000	CQC			LW12/S	02-DEC-93		2.96	UGG			
			NB	S	24.000	CQC			LW12/S	02-DEC-93		24.6	UGG			
			NB	S	24.000	CQC			LW12/S	02-DEC-93		24.4	UGG			
			NG	S	10.000	CQC			LW12/S	02-DEC-93		9.52	UGG			
			NG	S	40.000	CQC			LW12/S	02-DEC-93		39.6	UGG			
			NG	S	40.000	CQC			LW12/S	02-DEC-93		39.4	UGG			
			PETN	S	9.530	CQC			LW12/S	02-DEC-93		9.35	UGG			
			PETN	S	38.100	CQC			LW12/S	02-DEC-93		36.1	UGG			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	KBBA		PETN	S	38.100	CQC			LW12/S	02-DEC-93		37.7	UGG			
			RDX	S	1.070	CQC			LW12/S	02-DEC-93		.975	UGG			
			RDX	S	8.600	CQC			LW12/S	02-DEC-93		8.26	UGG			
			RDX	S	8.600	CQC			LW12/S	02-DEC-93		7.92	UGG			
ES	MBAA		SE	S	.500	CQC			JD15/S	10-DEC-93		.569	UGG			
			SE	S	7.450	CQC			JD15/S	10-DEC-93		7.45	UGG			
			SE	S	7.940	CQC			JD15/S	10-DEC-93		7.84	UGG			
ES	MBEA		SE	S	.509	CQC			JD15/S	17-DEC-93		.498	UGG			
			SE	S	7.910	CQC			JD15/S	17-DEC-93		7.55	UGG			
			SE	S	7.980	CQC			JD15/S	17-DEC-93		7.91	UGG			
ES	MBFA		SE	S	.496	CQC			JD15/S	29-DEC-93		.496	UGG			
			SE	S	7.760	CQC			JD15/S	29-DEC-93		7.22	UGG			
			SE	S	7.930	CQC			JD15/S	29-DEC-93		7.51	UGG			
ES	MBGA		SE	S	.461	CQC			JD15/S	30-DEC-93		.387	UGG			
			SE	S	7.930	CQC			JD15/S	30-DEC-93		7.18	UGG			
			SE	S	7.960	CQC			JD15/S	30-DEC-93		7.5	UGG			
ES	MBHA		SE	S	.498	CQC			JD15/S	06-DEC-93		.428	UGG			
			SE	S	7.780	CQC			JD15/S	06-DEC-93		6.97	UGG			
			SE	S	7.880	CQC			JD15/S	06-DEC-93		7.24	UGG			
ES	NCAA		135TNB	S	1.140	CQC			LW12/S	07-DEC-93		.744	UGG			
			135TNB	S	9.140	CQC			LW12/S	07-DEC-93		7.42	UGG			
			135TNB	S	9.140	CQC			LW12/S	07-DEC-93		7.74	UGG			
			246TNT	S	1.140	CQC			LW12/S	07-DEC-93		1.05	UGG			
			246TNT	S	9.120	CQC			LW12/S	07-DEC-93		8.23	UGG			
			246TNT	S	9.120	CQC			LW12/S	07-DEC-93		7.9	UGG			
			24DNT	S	1.230	CQC			LW12/S	07-DEC-93		1.13	UGG			
			24DNT	S	9.810	CQC			LW12/S	07-DEC-93		8.73	UGG			
			24DNT	S	9.810	CQC			LW12/S	07-DEC-93		8.26	UGG			
			2NT	S	.539	CQC			LW12/S	07-DEC-93		.531	UGG			
			2NT	S	22.500	CQC			LW12/S	07-DEC-93		17.9	UGG			
			2NT	S	22.500	CQC			LW12/S	07-DEC-93		17.1	UGG			
			2NT	S	45.000	CQC			LW12/S	07-DEC-93		34.8	UGG			
			NB	S	3.000	CQC			LW12/S	07-DEC-93		3.1	UGG			
			NB	S	24.000	CQC			LW12/S	07-DEC-93		24.8	UGG			
			NB	S	24.000	CQC			LW12/S	07-DEC-93		23.9	UGG			
			NG	S	10.000	CQC			LW12/S	07-DEC-93		10	UGG			
			NG	S	40.000	CQC			LW12/S	07-DEC-93		39.1	UGG			
			NG	S	40.000	CQC			LW12/S	07-DEC-93		38.6	UGG			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Measurement Unit	Flag Codes	Data Quals	Prog
ES	NCAA		PETN	S	9.530	CQC			LW12/S	07-DEC-93		9.13	UGG			
			PETN	S	38.100	CQC			LW12/S	07-DEC-93		39.2	UGG			
			PETN	S	38.100	CQC			LW12/S	07-DEC-93		36.2	UGG			
			RDX	S	1.070	CQC			LW12/S	07-DEC-93		1	UGG			
			RDX	S	8.600	CQC			LW12/S	07-DEC-93		8.13	UGG			
			RDX	S	8.600	CQC			LW12/S	07-DEC-93		7.84	UGG			
ES	NCBA		135TNB	S	1.140	CQC			LW12/S	09-DEC-93		.726	UGG			
			135TNB	S	9.140	CQC			LW12/S	09-DEC-93		6.98	UGG			
			135TNB	S	9.140	CQC			LW12/S	09-DEC-93		7.55	UGG			
			246TNT	S	1.140	CQC			LW12/S	09-DEC-93		.991	UGG			
			246TNT	S	9.120	CQC			LW12/S	09-DEC-93		8	UGG			
			246TNT	S	9.120	CQC			LW12/S	09-DEC-93		7.88	UGG			
			24DNT	S	1.230	CQC			LW12/S	09-DEC-93		1.12	UGG			
			24DNT	S	9.810	CQC			LW12/S	09-DEC-93		8.5	UGG			
			24DNT	S	9.810	CQC			LW12/S	09-DEC-93		8.42	UGG			
			2NT	S	.539	CQC			LW12/S	09-DEC-93		.524	UGG			
			2NT	S	22.500	CQC			LW12/S	09-DEC-93		17.5	UGG			
			2NT	S	22.500	CQC			LW12/S	09-DEC-93		17.2	UGG			
			2NT	S	45.000	CQC			LW12/S	09-DEC-93		43.6	UGG			
			NB	S	3.000	CQC			LW12/S	09-DEC-93		3.06	UGG			
			NB	S	24.000	CQC			LW12/S	09-DEC-93		24.5	UGG			
			NB	S	24.000	CQC			LW12/S	09-DEC-93		24.1	UGG			
			NG	S	10.000	CQC			LW12/S	09-DEC-93		9.64	UGG			
			NG	S	40.000	CQC			LW12/S	09-DEC-93		36.8	UGG			
			NG	S	40.000	CQC			LW12/S	09-DEC-93		37.4	UGG			
			PETN	S	9.530	CQC			LW12/S	09-DEC-93		8.86	UGG			
			PETN	S	38.100	CQC			LW12/S	09-DEC-93		36.7	UGG			
			PETN	S	38.100	CQC			LW12/S	09-DEC-93		34.5	UGG			
			RDX	S	1.070	CQC			LW12/S	09-DEC-93		1.05	UGG			
			RDX	S	8.600	CQC			LW12/S	09-DEC-93		7.96	UGG			
			RDX	S	8.600	CQC			LW12/S	09-DEC-93		7.72	UGG			
ES	OEEA		246TBP	S	6.700	CQC			LM18/S	29-NOV-93		4.6	UGG			
			2FBP	S	3.300	CQC			LM18/S	29-NOV-93		2.7	UGG			
			2FP	S	6.700	CQC			LM18/S	29-NOV-93		6.1	UGG			
			NBD5	S	3.300	CQC			LM18/S	29-NOV-93		3.4	UGG			
			PHEND6	S	6.700	CQC			LM18/S	29-NOV-93		5.9	UGG			
			TRPD14	S	3.300	CQC			LM18/S	29-NOV-93		2.1	UGG			
ES	PDFA		CL	S	4000.000	CQC			TT10/W	07-JAN-94		3600	UGL			
			CL	S	25000.000	CQC			TT10/W	07-JAN-94		25000	UGL			
			CL	S	25000.000	CQC			TT10/W	07-JAN-94		25000	UGL			
			SO4	S	20000.000	CQC			TT10/W	07-JAN-94		18000	UGL			
			SO4	S	250000.000	CQC			TT10/W	07-JAN-94		2.50 E 5	UGL			
			SO4	S	250000.000	CQC			TT10/W	07-JAN-94		2.50 E 5	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	PDMA		CL	S	4000.000	CQC			TT10/W	11-FEB-94		3700	UGL			
			CL	S	25000.000	CQC			TT10/W	11-FEB-94		25000	UGL			
			CL	S	25000.000	CQC			TT10/W	11-FEB-94		25000	UGL			
			SO4	S	20000.000	CQC			TT10/W	11-FEB-94		17000	UGL			
			SO4	S	250000.000	CQC			TT10/W	11-FEB-94		2.50 E 5	UGL			
			SO4	S	250000.000	CQC			TT10/W	11-FEB-94		2.50 E 5	UGL			
ES	QBAA		AS	S	.500	CQC			JD19/S	08-DEC-93		.516	UGG			
			AS	S	7.450	CQC			JD19/S	08-DEC-93		7.46	UGG			
			AS	S	7.940	CQC			JD19/S	08-DEC-93		7.97	UGG			
ES	QBEA		AS	S	.527	CQC			JD19/S	14-DEC-93		.612	UGG			
			AS	S	8.130	CQC			JD19/S	14-DEC-93		8.29	UGG			
			AS	S	8.230	CQC			JD19/S	14-DEC-93		8.63	UGG			
ES	QBFA		AS	S	.496	CQC			JD19/S	28-DEC-93		.607	UGG			
			AS	S	7.760	CQC			JD19/S	28-DEC-93		8.03	UGG			
			AS	S	7.930	CQC			JD19/S	28-DEC-93		8.29	UGG			
ES	QBGA		AS	S	.461	CQC			JD19/S	29-DEC-93		.663	UGG			
			AS	S	7.930	CQC			JD19/S	29-DEC-93		7.49	UGG			
			AS	S	7.960	CQC			JD19/S	29-DEC-93		7.62	UGG			
ES	QBHA		AS	S	.498	CQC			JD19/S	07-DEC-93		.607	UGG			
			AS	S	7.780	CQC			JD19/S	07-DEC-93		8.18	UGG			
			AS	S	7.880	CQC			JD19/S	07-DEC-93		8.33	UGG			
ES	QHAA		HG	S	.099	CQC			JB01/S	15-NOV-93		9.84 E -2	UGG			
			HG	S	.787	CQC			JB01/S	15-NOV-93		.79	UGG			
			HG	S	.800	CQC			JB01/S	15-NOV-93		.814	UGG			
ES	QHGA		HG	S	.099	CQC			JB01/S	16-NOV-93		.111	UGG			
			HG	S	.793	CQC			JB01/S	16-NOV-93		.783	UGG			
			HG	S	.799	CQC			JB01/S	16-NOV-93		.798	UGG			
ES	QHIA		HG	S	.100	CQC			JB01/S	20-NOV-93		.113	UGG			
			HG	S	.798	CQC			JB01/S	20-NOV-93		.866	UGG			
			HG	S	.799	CQC			JB01/S	20-NOV-93		.867	UGG			
ES	QHJA		HG	S	.097	CQC			JB01/S	20-NOV-93		.105	UGG			
			HG	S	.786	CQC			JB01/S	20-NOV-93		.787	UGG			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Value	Unit	Flag Codes	Data Quals	Prog
ES	QHJA		HG	S	.795	CQC			JB01/S	20-NOV-93		.791	UGG			
ES	QHKA		HG	S	.100	CQC			JB01/S	23-NOV-93		.105	UGG			
			HG	S	.800	CQC			JB01/S	23-NOV-93		.823	UGG			
			HG	S	.800	CQC			JB01/S	23-NOV-93		.826	UGG			
ES	TCCA		HG	S	.500	CQC			SB01/W	18-NOV-93		.527	UGL			
			HG	S	2.500	CQC			SB01/W	18-NOV-93		2.64	UGL			
			HG	S	2.500	CQC			SB01/W	18-NOV-93		2.61	UGL			
ES	TCGA		HG	S	.500	CQC			SB01/W	09-DEC-93		.541	UGL			
			HG	S	2.500	CQC			SB01/W	09-DEC-93		2.5	UGL			
			HG	S	2.500	CQC			SB01/W	09-DEC-93		2.6	UGL			
ES	TCTA		HG	S	.500	CQC			SB01/W	08-FEB-94		.494	UGL			
			HG	S	2.500	CQC			SB01/W	08-FEB-94		2.5	UGL			
			HG	S	2.500	CQC			SB01/W	08-FEB-94		2.63	UGL			
ES	TCVA		HG	S	.500	CQC			SB01/W	15-FEB-94		.487	UGL			
			HG	S	2.500	CQC			SB01/W	15-FEB-94		2.56	UGL			
			HG	S	2.500	CQC			SB01/W	15-FEB-94		2.52	UGL			
ES	TDCA		AENSLF	S	.500	CQC			UH13/W	21-DEC-93		.409	UGL			
			ALDRN	S	.500	CQC			UH13/W	21-DEC-93		.281	UGL			
			BENSLF	S	.500	CQC			UH13/W	21-DEC-93		.544	UGL			
			CL10BP	S	1.250	CQC			UH13/W	21-DEC-93		1.1	UGL	Z		
			CL10BP	S	1.250	CQC			UH13/W	21-DEC-93		1.2	UGL	Z		
			CL4XYL	S	1.250	CQC			UH13/W	21-DEC-93		.679	UGL	Z		
			CL4XYL	S	1.250	CQC			UH13/W	21-DEC-93		.63	UGL	Z		
			DLDRN	S	.500	CQC			UH13/W	21-DEC-93		.444	UGL			
			ENDRN	S	.500	CQC			UH13/W	21-DEC-93		.435	UGL			
			HPCL	S	.500	CQC			UH13/W	21-DEC-93		.3	UGL			
			ISODR	S	1.000	CQC			UH13/W	21-DEC-93		.585	UGL			
			LIN	S	.500	CQC			UH13/W	21-DEC-93		.285	UGL			
			MEXCLR	S	1.000	CQC			UH13/W	21-DEC-93		1.06	UGL			
			PPDDT	S	.500	CQC			UH13/W	21-DEC-93		.393	UGL			
ES	TDYA		AENSLF	S	.500	CQC			UH13/W	27-FEB-94		.381	UGL			
			ALDRN	S	.500	CQC			UH13/W	27-FEB-94		.318	UGL			
			BENSLF	S	.500	CQC			UH13/W	27-FEB-94		.434	UGL			
			CL10BP	S	1.250	CQC			UH13/W	27-FEB-94		.76	UGL	Z		
			CL10BP	S	1.250	CQC			UH13/W	27-FEB-94		.8	UGL	Z		
			CL4XYL	S	1.250	CQC			UH13/W	27-FEB-94		.776	UGL	Z		

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Value	Unit	Flag Codes	Data Quals	Prog
ES	TDYA		CL4XYL	S	1.250	CQC			UH13/W	27-FEB-94		.807	UGL	Z		
			DLDRN	S	.500	CQC			UH13/W	27-FEB-94		.398	UGL			
			ENDRN	S	.500	CQC			UH13/W	27-FEB-94		.377	UGL			
			HPCL	S	.500	CQC			UH13/W	27-FEB-94		.345	UGL			
			ISODR	S	1.000	CQC			UH13/W	27-FEB-94		.561	UGL			
			LIN	S	.500	CQC			UH13/W	27-FEB-94		.352	UGL			
			MEXCLR	S	1.000	CQC			UH13/W	27-FEB-94		.741	UGL			
			PPDDT	S	.500	CQC			UH13/W	27-FEB-94		.349	UGL			
ES	TEJF		ALK	S	230000.000	CQC			3101/W	06-JAN-94		2.3 E 5	UGL			
ES	TEQH		ALK	S	1070000.000	CQC			3101/W	14-FEB-94		1.2 E 6	UGL			
ES	THAA		135TNB	S	.979	CQC			UW32/W	07-DEC-93		.52	UGL			
			135TNB	S	9.790	CQC			UW32/W	07-DEC-93		5.61	UGL			
			135TNB	S	9.790	CQC			UW32/W	07-DEC-93		5.33	UGL			
			135TNB	S	49.000	CQC			UW32/W	07-DEC-93		46.8	UGL			
			246TNT	S	1.350	CQC			UW32/W	07-DEC-93		1.27	UGL			
			246TNT	S	13.500	CQC			UW32/W	07-DEC-93		11.9	UGL			
			246TNT	S	13.500	CQC			UW32/W	07-DEC-93		12.2	UGL			
			246TNT	S	74.300	CQC			UW32/W	07-DEC-93		69.3	UGL			
			24DNT	S	.136	CQC			UW32/W	07-DEC-93		.127	UGL			
			24DNT	S	1.360	CQC			UW32/W	07-DEC-93		1.22	UGL			
			24DNT	S	1.360	CQC			UW32/W	07-DEC-93		1.2	UGL			
			24DNT	S	18.200	CQC			UW32/W	07-DEC-93		16.9	UGL			
			2NT	S	.757	CQC			UW32/W	07-DEC-93		.691	UGL			
			2NT	S	7.570	CQC			UW32/W	07-DEC-93		6.47	UGL			
			2NT	S	7.570	CQC			UW32/W	07-DEC-93		6.64	UGL			
			2NT	S	90.800	CQC			UW32/W	07-DEC-93		77.8	UGL			
			34DNT	S	6.240	CQC			UW32/W	07-DEC-93		6.11	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	07-DEC-93		5.87	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	07-DEC-93		5.7	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	07-DEC-93		5.96	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	07-DEC-93		5.96	UGL	Z		
			NB	S	1.150	CQC			UW32/W	07-DEC-93		.992	UGL			
			NB	S	11.500	CQC			UW32/W	07-DEC-93		9.91	UGL			
			NB	S	11.500	CQC			UW32/W	07-DEC-93		9.47	UGL			
			NB	S	91.800	CQC			UW32/W	07-DEC-93		77.9	UGL			
			RDX	S	2.360	CQC			UW32/W	07-DEC-93		2.14	UGL			
			RDX	S	23.600	CQC			UW32/W	07-DEC-93		20.9	UGL			
			RDX	S	23.600	CQC			UW32/W	07-DEC-93		19.6	UGL			
			RDX	S	94.200	CQC			UW32/W	07-DEC-93		85	UGL			
ES	THAB		135TNB	S	.979	CQC			UW32/W	17-FEB-94		.645	UGL			
			135TNB	S	9.790	CQC			UW32/W	17-FEB-94		8.13	UGL			
			135TNB	S	9.790	CQC			UW32/W	17-FEB-94		8.11	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Measurement Unit	Flag Codes	Data Quals	Prog
ES	THAB		135TNB	S	44.100	CQC			UW32/W	21-FEB-94		37.9	UGL			
			246TNT	S	1.350	CQC			UW32/W	17-FEB-94		1.12	UGL			
			246TNT	S	13.500	CQC			UW32/W	17-FEB-94		12.1	UGL			
			246TNT	S	13.500	CQC			UW32/W	17-FEB-94		12.5	UGL			
			246TNT	S	87.800	CQC			UW32/W	21-FEB-94		77.9	UGL			
			24DNT	S	.129	CQC			UW32/W	17-FEB-94		8.20 E -2	UGL		J	
			24DNT	S	1.290	CQC			UW32/W	17-FEB-94		1.06	UGL		J	
			24DNT	S	1.290	CQC			UW32/W	17-FEB-94		1.08	UGL		J	
			24DNT	S	16.200	CQC			UW32/W	21-FEB-94		14.5	UGL		J	
			2NT	S	.813	CQC			UW32/W	17-FEB-94		.545	UGL			
			2NT	S	8.130	CQC			UW32/W	17-FEB-94		7.39	UGL			
			2NT	S	8.130	CQC			UW32/W	17-FEB-94		7.14	UGL			
			2NT	S	97.500	CQC			UW32/W	21-FEB-94		87.8	UGL			
			34DNT	S	6.240	CQC			UW32/W	17-FEB-94		6.16	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	17-FEB-94		4.63	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	17-FEB-94		6.18	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	17-FEB-94		5.93	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	21-FEB-94		5.62	UGL	Z		
			NB	S	1.240	CQC			UW32/W	17-FEB-94		.967	UGL			
			NB	S	12.400	CQC			UW32/W	17-FEB-94		12	UGL			
			NB	S	12.400	CQC			UW32/W	17-FEB-94		11.7	UGL			
			NB	S	103.000	CQC			UW32/W	21-FEB-94		91.8	UGL			
			RDX	S	2.360	CQC			UW32/W	17-FEB-94		1.87	UGL			
			RDX	S	23.600	CQC			UW32/W	17-FEB-94		21.4	UGL			
			RDX	S	23.600	CQC			UW32/W	17-FEB-94		20.9	UGL			
			RDX	S	94.200	CQC			UW32/W	21-FEB-94		79.4	UGL			
ES	THHA		135TNB	S	.979	CQC			UW32/W	17-DEC-93		.852	UGL			
			135TNB	S	9.790	CQC			UW32/W	17-DEC-93		9.6	UGL			
			135TNB	S	9.790	CQC			UW32/W	17-DEC-93		9.59	UGL			
			135TNB	S	49.000	CQC			UW32/W	17-DEC-93		45.9	UGL			
			246TNT	S	1.350	CQC			UW32/W	17-DEC-93		1.23	UGL			
			246TNT	S	13.500	CQC			UW32/W	17-DEC-93		13	UGL			
			246TNT	S	13.500	CQC			UW32/W	17-DEC-93		13.1	UGL			
			246TNT	S	74.300	CQC			UW32/W	17-DEC-93		65.5	UGL			
			24DNT	S	.136	CQC			UW32/W	17-DEC-93		.124	UGL			
			24DNT	S	1.360	CQC			UW32/W	17-DEC-93		1.24	UGL			
			24DNT	S	1.360	CQC			UW32/W	17-DEC-93		1.22	UGL			
			24DNT	S	18.200	CQC			UW32/W	17-DEC-93		15.8	UGL			
			2NT	S	.757	CQC			UW32/W	17-DEC-93		.548	UGL			
			2NT	S	7.570	CQC			UW32/W	17-DEC-93		5.64	UGL			
			2NT	S	7.570	CQC			UW32/W	17-DEC-93		5.57	UGL			
			2NT	S	90.800	CQC			UW32/W	17-DEC-93		70	UGL			
			34DNT	S	6.240	CQC			UW32/W	17-DEC-93		5.72	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	17-DEC-93		6.31	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	17-DEC-93		5.16	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	17-DEC-93		5.44	UGL	Z		
			34DNT	S	6.240	CQC			UW32/W	17-DEC-93		5.44	UGL	Z		
			NB	S	1.150	CQC			UW32/W	17-DEC-93		.903	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	THHA		NB	S	11.500	CQC			UW32/W	17-DEC-93		9.18	UGL			
			NB	S	11.500	CQC			UW32/W	17-DEC-93		9.05	UGL			
			NB	S	91.800	CQC			UW32/W	17-DEC-93		74	UGL			
			RDX	S	2.360	CQC			UW32/W	17-DEC-93		2.25	UGL			
			RDX	S	23.600	CQC			UW32/W	17-DEC-93		22.5	UGL			
			RDX	S	23.600	CQC			UW32/W	17-DEC-93		22.5	UGL			
			RDX	S	94.200	CQC			UW32/W	17-DEC-93		86.5	UGL			
ES	UBAA		AG	S	.782	CQC			JS16/S	18-NOV-93		.702	UGG			
			AG	S	7.620	CQC			JS16/S	18-NOV-93		7.51	UGG			
			AG	S	7.640	CQC			JS16/S	18-NOV-93		7.5	UGG			
			BE	S	4.890	CQC			JS16/S	18-NOV-93		4.97	UGG			
			BE	S	47.600	CQC			JS16/S	18-NOV-93		46.7	UGG			
			BE	S	47.700	CQC			JS16/S	18-NOV-93		47.2	UGG			
			CD	S	4.890	CQC			JS16/S	18-NOV-93		4.97	UGG			
			CD	S	47.600	CQC			JS16/S	18-NOV-93		46.3	UGG			
			CD	S	47.700	CQC			JS16/S	18-NOV-93		46.8	UGG			
			CR	S	9.770	CQC			JS16/S	18-NOV-93		10.4	UGG			
			CR	S	95.200	CQC			JS16/S	18-NOV-93		91.6	UGG			
			CR	S	95.500	CQC			JS16/S	18-NOV-93		92.4	UGG			
			CU	S	4.890	CQC			JS16/S	18-NOV-93		4.82	UGG			
			CU	S	47.600	CQC			JS16/S	18-NOV-93		45.9	UGG			
			CU	S	47.700	CQC			JS16/S	18-NOV-93		46.4	UGG			
			NI	S	4.890	CQC			JS16/S	18-NOV-93		5.51	UGG			
			NI	S	47.600	CQC			JS16/S	18-NOV-93		45.7	UGG			
			NI	S	47.700	CQC			JS16/S	18-NOV-93		46.2	UGG			
			TL	S	9.770	CQC			JS16/S	18-NOV-93		12.6	UGG			
			TL	S	95.200	CQC			JS16/S	18-NOV-93		105	UGG			
			TL	S	95.500	CQC			JS16/S	18-NOV-93		102	UGG			
			ZN	S	9.770	CQC			JS16/S	18-NOV-93		9.64	UGG			
			ZN	S	95.200	CQC			JS16/S	18-NOV-93		90.5	UGG			
			ZN	S	95.500	CQC			JS16/S	18-NOV-93		91.5	UGG			
ES	UBGA		AG	S	.796	CQC			JS16/S	22-NOV-93		.772	UGG			
			AG	S	7.990	CQC			JS16/S	22-NOV-93		7.74	UGG			
			AG	S	8.000	CQC			JS16/S	22-NOV-93		7.66	UGG			
			BE	S	4.970	CQC			JS16/S	22-NOV-93		4.96	UGG			
			BE	S	49.900	CQC			JS16/S	22-NOV-93		49.1	UGG			
			BE	S	50.000	CQC			JS16/S	22-NOV-93		49.3	UGG			
			CD	S	4.970	CQC			JS16/S	22-NOV-93		4.66	UGG			
			CD	S	49.900	CQC			JS16/S	22-NOV-93		47.4	UGG			
			CD	S	50.000	CQC			JS16/S	22-NOV-93		47.1	UGG			
			CR	S	9.950	CQC			JS16/S	22-NOV-93		9.82	UGG			
			CR	S	99.900	CQC			JS16/S	22-NOV-93		94.2	UGG			
			CR	S	100.000	CQC			JS16/S	22-NOV-93		94.7	UGG			
			CU	S	4.970	CQC			JS16/S	22-NOV-93		4.74	UGG			
			CU	S	49.900	CQC			JS16/S	22-NOV-93		47.7	UGG			
			CU	S	50.000	CQC			JS16/S	22-NOV-93		47.8	UGG			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	UBGA		NI	S	4.970	CQC			JS16/S	22-NOV-93		5.44	UGG			
			NI	S	49.900	CQC			JS16/S	22-NOV-93		46.3	UGG			
			NI	S	50.000	CQC			JS16/S	22-NOV-93		47.6	UGG			
			TL	S	9.950	CQC			JS16/S	22-NOV-93		10.5	UGG			
			TL	S	99.900	CQC			JS16/S	22-NOV-93		95.3	UGG			
			TL	S	100.000	CQC			JS16/S	22-NOV-93		95.1	UGG			
			ZN	S	9.950	CQC			JS16/S	22-NOV-93		9.44	UGG			
			ZN	S	99.900	CQC			JS16/S	22-NOV-93		93.8	UGG			
			ZN	S	100.000	CQC			JS16/S	22-NOV-93		93.9	UGG			
ES	UBIA		AG	S	.787	CQC			JS16/S	30-NOV-93		.903	UGG			
			AG	S	7.400	CQC			JS16/S	30-NOV-93		7.58	UGG			
			AG	S	7.820	CQC			JS16/S	30-NOV-93		8.14	UGG			
			BE	S	4.920	CQC			JS16/S	30-NOV-93		5.01	UGG			
			BE	S	46.300	CQC			JS16/S	30-NOV-93		45.9	UGG			
			BE	S	48.900	CQC			JS16/S	30-NOV-93		48.9	UGG			
			CD	S	4.920	CQC			JS16/S	30-NOV-93		5.03	UGG			
			CD	S	46.300	CQC			JS16/S	30-NOV-93		46.1	UGG			
			CD	S	48.900	CQC			JS16/S	30-NOV-93		48.7	UGG			
			CR	S	9.840	CQC			JS16/S	30-NOV-93		9.71	UGG			
			CR	S	92.600	CQC			JS16/S	30-NOV-93		90.2	UGG			
			CR	S	97.800	CQC			JS16/S	30-NOV-93		95.7	UGG			
			CU	S	4.920	CQC			JS16/S	30-NOV-93		4.81	UGG			
			CU	S	46.300	CQC			JS16/S	30-NOV-93		45.4	UGG			
			CU	S	48.900	CQC			JS16/S	30-NOV-93		48.7	UGG			
			NI	S	4.920	CQC			JS16/S	30-NOV-93		4.68	UGG			
			NI	S	46.300	CQC			JS16/S	30-NOV-93		45.1	UGG			
			NI	S	48.900	CQC			JS16/S	30-NOV-93		48	UGG			
			TL	S	9.840	CQC			JS16/S	30-NOV-93		11.9	UGG			
			TL	S	92.600	CQC			JS16/S	30-NOV-93		100	UGG			
			TL	S	97.800	CQC			JS16/S	30-NOV-93		107	UGG			
			ZN	S	9.840	CQC			JS16/S	30-NOV-93		8.84	UGG			
			ZN	S	92.600	CQC			JS16/S	30-NOV-93		90	UGG			
			ZN	S	97.800	CQC			JS16/S	30-NOV-93		96.2	UGG			
ES	UBJA		AG	S	.779	CQC			JS16/S	01-DEC-93		.768	UGG			
			AG	S	7.910	CQC			JS16/S	01-DEC-93		7.97	UGG			
			AG	S	7.920	CQC			JS16/S	01-DEC-93		7.82	UGG			
			BE	S	4.870	CQC			JS16/S	01-DEC-93		4.87	UGG			
			BE	S	49.400	CQC			JS16/S	01-DEC-93		47	UGG			
			BE	S	49.500	CQC			JS16/S	01-DEC-93		48.3	UGG			
			CD	S	4.870	CQC			JS16/S	01-DEC-93		4.68	UGG			
			CD	S	49.400	CQC			JS16/S	01-DEC-93		46.6	UGG			
			CD	S	49.500	CQC			JS16/S	01-DEC-93		47.3	UGG			
			CR	S	9.730	CQC			JS16/S	01-DEC-93		10	UGG			
			CR	S	98.900	CQC			JS16/S	01-DEC-93		93.2	UGG			
			CR	S	99.100	CQC			JS16/S	01-DEC-93		95	UGG			
			CU	S	4.870	CQC			JS16/S	01-DEC-93		4.71	UGG			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Measurement Unit	Flag Codes	Data Quals	Prog
ES	UBJA		CU	S	49.400	CQC			JS16/S	01-DEC-93		46.7	UGG			
			CU	S	49.500	CQC			JS16/S	01-DEC-93		47.9	UGG			
			NI	S	4.870	CQC			JS16/S	01-DEC-93		5.48	UGG			
			NI	S	49.400	CQC			JS16/S	01-DEC-93		47.4	UGG			
			NI	S	49.500	CQC			JS16/S	01-DEC-93		47.4	UGG			
			TL	S	9.730	CQC			JS16/S	01-DEC-93		10.5	UGG			
			TL	S	98.900	CQC			JS16/S	01-DEC-93		105	UGG			
			TL	S	99.100	CQC			JS16/S	01-DEC-93		105	UGG			
			ZN	S	9.730	CQC			JS16/S	01-DEC-93		9.24	UGG			
			ZN	S	98.900	CQC			JS16/S	01-DEC-93		93.5	UGG			
			ZN	S	99.100	CQC			JS16/S	01-DEC-93		94.7	UGG			
ES	UBKA		AG	S	.799	CQC			JS16/S	01-DEC-93		.857	UGG			
			AG	S	7.980	CQC			JS16/S	01-DEC-93		8.04	UGG			
			AG	S	8.000	CQC			JS16/S	01-DEC-93		7.76	UGG			
			BE	S	4.990	CQC			JS16/S	01-DEC-93		4.87	UGG			
			BE	S	49.900	CQC			JS16/S	01-DEC-93		49.1	UGG			
			BE	S	50.000	CQC			JS16/S	01-DEC-93		48.5	UGG			
			CD	S	4.990	CQC			JS16/S	01-DEC-93		4.91	UGG			
			CD	S	49.900	CQC			JS16/S	01-DEC-93		47.1	UGG			
			CD	S	50.000	CQC			JS16/S	01-DEC-93		46.7	UGG			
			CR	S	9.990	CQC			JS16/S	01-DEC-93		10	UGG			
			CR	S	99.800	CQC			JS16/S	01-DEC-93		94.8	UGG			
			CR	S	100.000	CQC			JS16/S	01-DEC-93		93.5	UGG			
			CU	S	4.990	CQC			JS16/S	01-DEC-93		4.95	UGG			
			CU	S	49.900	CQC			JS16/S	01-DEC-93		48.4	UGG			
			CU	S	50.000	CQC			JS16/S	01-DEC-93		47.5	UGG			
			NI	S	4.990	CQC			JS16/S	01-DEC-93		5.35	UGG			
			NI	S	49.900	CQC			JS16/S	01-DEC-93		47.7	UGG			
			NI	S	50.000	CQC			JS16/S	01-DEC-93		46.4	UGG			
			TL	S	9.990	CQC			JS16/S	01-DEC-93		12.5	UGG			
			TL	S	99.800	CQC			JS16/S	01-DEC-93		103	UGG			
			TL	S	100.000	CQC			JS16/S	01-DEC-93		106	UGG			
			ZN	S	9.990	CQC			JS16/S	01-DEC-93		9.98	UGG			
			ZN	S	99.800	CQC			JS16/S	01-DEC-93		95.1	UGG			
			ZN	S	100.000	CQC			JS16/S	01-DEC-93		93.6	UGG			
ES	UCAA		TL	S	10.000	CQC			SD09/W	08-DEC-93		10.7	UGL			
			TL	S	20.000	CQC			SD09/W	08-DEC-93		20	UGL			
			TL	S	20.000	CQC			SD09/W	08-DEC-93		21.2	UGL			
ES	UCEA		TL	S	10.000	CQC			SD09/W	06-JAN-94		10.4	UGL			
			TL	S	20.000	CQC			SD09/W	06-JAN-94		21.1	UGL			
			TL	S	20.000	CQC			SD09/W	06-JAN-94		20.6	UGL			
ES	UCNA		TL	S	10.000	CQC			SD09/W	08-FEB-94		10.3	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Measurement Unit	Flag Codes	Data Quals	Prog
ES	UCNA		TL	S	20.000	CQC			SD09/W	08-FEB-94		20.3	UGL			
			TL	S	20.000	CQC			SD09/W	08-FEB-94		19.3	UGL			
ES	UCPA		TL	S	10.000	CQC			SD09/W	14-FEB-94		10	UGL			
			TL	S	20.000	CQC			SD09/W	14-FEB-94		19.6	UGL			
			TL	S	20.000	CQC			SD09/W	14-FEB-94		19.9	UGL			
ES	WCBA		PB	S	10.000	CQC			SD20/W	08-DEC-93		11.4	UGL			
			PB	S	80.000	CQC			SD20/W	08-DEC-93		85.6	UGL			
			PB	S	80.000	CQC			SD20/W	08-DEC-93		90.5	UGL			
ES	WCGA		PB	S	10.000	CQC			SD20/W	30-DEC-93		9.6	UGL			
			PB	S	80.000	CQC			SD20/W	30-DEC-93		76.5	UGL			
			PB	S	80.000	CQC			SD20/W	30-DEC-93		74.8	UGL			
ES	WCSA		PB	S	10.000	CQC			SD20/W	08-FEB-94		9.6	UGL			
			PB	S	80.000	CQC			SD20/W	08-FEB-94		79	UGL			
			PB	S	80.000	CQC			SD20/W	08-FEB-94		76.9	UGL			
ES	WCUA		PB	S	10.000	CQC			SD20/W	15-FEB-94		11	UGL			
			PB	S	80.000	CQC			SD20/W	15-FEB-94		79.9	UGL			
			PB	S	80.000	CQC			SD20/W	15-FEB-94		79.8	UGL			
ES	WDFB		246TBP	S	100.000	CQC			UM18/W	20-FEB-94		48	UGL			
			2FBP	S	50.000	CQC			UM18/W	20-FEB-94		23	UGL			
			2FP	S	100.000	CQC			UM18/W	20-FEB-94		51	UGL			
			NBD5	S	50.000	CQC			UM18/W	20-FEB-94		25	UGL			
			PHEND6	S	100.000	CQC			UM18/W	20-FEB-94		38	UGL			
			TRPD14	S	50.000	CQC			UM18/W	20-FEB-94		39	UGL			
ES	WDHA		246TBP	S	100.000	CQC			UM18/W	13-DEC-93		96	UGL			
			2FBP	S	50.000	CQC			UM18/W	13-DEC-93		33	UGL			
			2FP	S	100.000	CQC			UM18/W	13-DEC-93		66	UGL			
			NBD5	S	50.000	CQC			UM18/W	13-DEC-93		40	UGL			
			PHEND6	S	100.000	CQC			UM18/W	13-DEC-93		48	UGL			
			TRPD14	S	50.000	CQC			UM18/W	13-DEC-93		46	UGL			
ES	XCBA		SE	S	5.000	CQC			SD21/W	13-DEC-93		5.1	UGL			
			SE	S	75.000	CQC			SD21/W	13-DEC-93		77.2	UGL			
			SE	S	75.000	CQC			SD21/W	13-DEC-93		73.1	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Measurement Unit	Flag Codes	Data Quals	Prog
ES	XCFA		SE	S	5.000	CQC			SD21/W	06-JAN-94		4.9	UGL			
			SE	S	75.000	CQC			SD21/W	06-JAN-94		67.3	UGL			
			SE	S	75.000	CQC			SD21/W	06-JAN-94		71	UGL			
ES	XCQA		SE	S	5.000	CQC			SD21/W	08-FEB-94		4.7	UGL			
			SE	S	75.000	CQC			SD21/W	08-FEB-94		70	UGL			
			SE	S	75.000	CQC			SD21/W	08-FEB-94		71.3	UGL			
ES	XCSA		SE	S	5.000	CQC			SD21/W	14-FEB-94		4.3	UGL			
			SE	S	75.000	CQC			SD21/W	14-FEB-94		71.2	UGL			
			SE	S	75.000	CQC			SD21/W	14-FEB-94		69	UGL			
ES	XDEA		12DCD4	S	50.000	CQC			UM20/W	24-NOV-93		50	UGL			
			4BFB	S	50.000	CQC			UM20/W	24-NOV-93		50	UGL			
			MEC6D8	S	50.000	CQC			UM20/W	24-NOV-93		50	UGL			
ES	XDPB		12DCD4	S	50.000	CQC			UM20/W	08-FEB-94		52	UGL			
			4BFB	S	50.000	CQC			UM20/W	08-FEB-94		53	UGL			
			MEC6D8	S	50.000	CQC			UM20/W	08-FEB-94		51	UGL			
ES	XDRB		12DCD4	S	50.000	CQC			UM20/W	14-FEB-94		47	UGL			
			4BFB	S	50.000	CQC			UM20/W	14-FEB-94		47	UGL			
			MEC6D8	S	50.000	CQC			UM20/W	14-FEB-94		47	UGL			
ES	XYW		111TCE	S	4.000	CQC			UO02/W	12-AUG-93		4.57	UGL			
			111TCE	S	40.000	CQC			UO02/W	12-AUG-93		46.1	UGL			
			111TCE	S	40.000	CQC			UO02/W	12-AUG-93		44.6	UGL			
			11DCE	S	4.000	CQC			UO02/W	12-AUG-93		4.44	UGL			
			11DCE	S	40.000	CQC			UO02/W	12-AUG-93		47.7	UGL			
			11DCE	S	40.000	CQC			UO02/W	12-AUG-93		47	UGL			
			C6H6	S	4.040	CQC			UO02/W	12-AUG-93		4.31	UGL			
			C6H6	S	40.400	CQC			UO02/W	12-AUG-93		45	UGL			
			C6H6	S	40.400	CQC			UO02/W	12-AUG-93		44.9	UGL			
			CHCL3	S	4.000	CQC			UO02/W	12-AUG-93		4.36	UGL			
			CHCL3	S	40.000	CQC			UO02/W	12-AUG-93		45.9	UGL			
			CHCL3	S	40.000	CQC			UO02/W	12-AUG-93		45	UGL			
			CLC6H5	S	3.920	CQC			UO02/W	12-AUG-93		4.32	UGL			
			CLC6H5	S	39.200	CQC			UO02/W	12-AUG-93		43.5	UGL			
			CLC6H5	S	39.200	CQC			UO02/W	12-AUG-93		42.7	UGL			
			ETC6H5	S	4.000	CQC			UO02/W	12-AUG-93		3.97	UGL			
			ETC6H5	S	40.000	CQC			UO02/W	12-AUG-93		45.1	UGL			
			ETC6H5	S	40.000	CQC			UO02/W	12-AUG-93		44.5	UGL			
			MEC6H5	S	3.960	CQC			UO02/W	12-AUG-93		4.27	UGL			
			MEC6H5	S	39.600	CQC			UO02/W	12-AUG-93		43.5	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Measurement Unit	Flag Codes	Data Quals	Prog
ES	XYW		MEC6H5	S	39.600	CQC			U002/W	12-AUG-93		43.2	UGL			
			TCLEE	S	4.040	CQC			U002/W	12-AUG-93		4.28	UGL			
			TCLEE	S	40.400	CQC			U002/W	12-AUG-93		45.8	UGL			
			TCLEE	S	40.400	CQC			U002/W	12-AUG-93		45.9	UGL			
			TRCLE	S	4.040	CQC			U002/W	12-AUG-93		4.48	UGL			
			TRCLE	S	40.400	CQC			U002/W	12-AUG-93		45.8	UGL			
			TRCLE	S	40.400	CQC			U002/W	12-AUG-93		46.1	UGL			
ES	XYZ		C6H6	S	3.960	CQC			U002/W	06-NOV-93		3.97	UGL			
			C6H6	S	39.600	CQC			U002/W	06-NOV-93		41.1	UGL			
			C6H6	S	39.600	CQC			U002/W	06-NOV-93		35.7	UGL			
			ETC6H5	S	4.000	CQC			U002/W	06-NOV-93		4	UGL			
			ETC6H5	S	40.000	CQC			U002/W	06-NOV-93		41.4	UGL			
			ETC6H5	S	40.000	CQC			U002/W	06-NOV-93		36.2	UGL			
			MEC6H5	S	3.960	CQC			U002/W	06-NOV-93		3.93	UGL			
			MEC6H5	S	39.600	CQC			U002/W	06-NOV-93		41.5	UGL			
			MEC6H5	S	39.600	CQC			U002/W	06-NOV-93		36	UGL			
ES	YCCA		AS	S	5.000	CQC			SD22/W	09-DEC-93		5	UGL			
			AS	S	75.000	CQC			SD22/W	09-DEC-93		81.3	UGL			
			AS	S	75.000	CQC			SD22/W	08-DEC-93		79.9	UGL			
ES	YCGA		AS	S	5.000	CQC			SD22/W	06-JAN-94		5.4	UGL			
			AS	S	75.000	CQC			SD22/W	06-JAN-94		73.6	UGL			
			AS	S	75.000	CQC			SD22/W	06-JAN-94		73.9	UGL			
ES	YCRA		AS	S	5.000	CQC			SD22/W	08-FEB-94		5.2	UGL			
			AS	S	75.000	CQC			SD22/W	08-FEB-94		71.3	UGL			
			AS	S	75.000	CQC			SD22/W	08-FEB-94		74.5	UGL			
ES	YCTA		AS	S	5.000	CQC			SD22/W	15-FEB-94		5.2	UGL			
			AS	S	75.000	CQC			SD22/W	15-FEB-94		77.6	UGL			
			AS	S	75.000	CQC			SD22/W	15-FEB-94		75.2	UGL			
ES	ZFCA		BA	S	10.000	CQC			SS10/W	29-NOV-93		9.59	UGL			
			BA	S	3750.000	CQC			SS10/W	29-NOV-93		3730	UGL			
			BA	S	7500.000	CQC			SS10/W	29-NOV-93		7360	UGL			
			BA	S	7500.000	CQC			SS10/W	29-NOV-93		7370	UGL			
			CA	S	1000.000	CQC			SS10/W	29-NOV-93		1000	UGL			
			CA	S	7500.000	CQC			SS10/W	29-NOV-93		7420	UGL			
			CA	S	15000.000	CQC			SS10/W	29-NOV-93		14500	UGL			
			CA	S	15000.000	CQC			SS10/W	29-NOV-93		14600	UGL			
			CD	S	15.000	CQC			SS10/W	29-NOV-93		15.9	UGL			
			CD	S	2000.000	CQC			SS10/W	29-NOV-93		1960	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Unit	Flag Codes	Data Quals	Prog
ES	ZFCA		CD	S	4000.000	CQC			SS10/W	29-NOV-93		3860	UGL			
			CD	S	4000.000	CQC			SS10/W	29-NOV-93		3870	UGL			
			CO	S	50.000	CQC			SS10/W	29-NOV-93		49.4	UGL			
			CO	S	20000.000	CQC			SS10/W	29-NOV-93		19400	UGL			
			CO	S	40000.000	CQC			SS10/W	29-NOV-93		37800	UGL			
			CO	S	40000.000	CQC			SS10/W	29-NOV-93		38100	UGL			
			CR	S	10.000	CQC			SS10/W	29-NOV-93		9.24	UGL			
			CR	S	2000.000	CQC			SS10/W	29-NOV-93		1960	UGL			
			CR	S	4000.000	CQC			SS10/W	29-NOV-93		3830	UGL			
			CR	S	4000.000	CQC			SS10/W	29-NOV-93		3860	UGL			
			CU	S	20.000	CQC			SS10/W	29-NOV-93		19.8	UGL			
			CU	S	4000.000	CQC			SS10/W	29-NOV-93		3970	UGL			
			CU	S	8000.000	CQC			SS10/W	29-NOV-93		7840	UGL			
			CU	S	8000.000	CQC			SS10/W	29-NOV-93		7850	UGL			
			MG	S	1000.000	CQC			SS10/W	29-NOV-93		916	UGL			
			MG	S	7500.000	CQC			SS10/W	29-NOV-93		7270	UGL			
			MG	S	15000.000	CQC			SS10/W	29-NOV-93		14500	UGL			
			MG	S	15000.000	CQC			SS10/W	29-NOV-93		14500	UGL			
			MN	S	10.000	CQC			SS10/W	29-NOV-93		8.84	UGL			
			MN	S	750.000	CQC			SS10/W	29-NOV-93		740	UGL			
			MN	S	1500.000	CQC			SS10/W	29-NOV-93		1450	UGL			
			MN	S	1500.000	CQC			SS10/W	29-NOV-93		1450	UGL			
			NA	S	1000.000	CQC			SS10/W	29-NOV-93		1040	UGL			
			NA	S	20000.000	CQC			SS10/W	29-NOV-93		19500	UGL			
			NA	S	40000.000	CQC			SS10/W	29-NOV-93		38600	UGL			
			NA	S	40000.000	CQC			SS10/W	29-NOV-93		38300	UGL			
			NI	S	50.000	CQC			SS10/W	29-NOV-93		48.8	UGL			
			NI	S	6000.000	CQC			SS10/W	29-NOV-93		5820	UGL			
			NI	S	12000.000	CQC			SS10/W	29-NOV-93		11400	UGL			
			NI	S	12000.000	CQC			SS10/W	29-NOV-93		11400	UGL			
			ZN	S	40.000	CQC			SS10/W	29-NOV-93		40.8	UGL			
			ZN	S	7500.000	CQC			SS10/W	29-NOV-93		7290	UGL			
			ZN	S	15000.000	CQC			SS10/W	29-NOV-93		14300	UGL			
			ZN	S	15000.000	CQC			SS10/W	29-NOV-93		14300	UGL			
ES	ZFGA		BA	S	10.000	CQC			SS10/W	10-DEC-93		11.5	UGL			
			BA	S	3750.000	CQC			SS10/W	10-DEC-93		3620	UGL			
			BA	S	7500.000	CQC			SS10/W	10-DEC-93		7050	UGL			
			BA	S	7500.000	CQC			SS10/W	10-DEC-93		7180	UGL			
			CA	S	1000.000	CQC			SS10/W	10-DEC-93		1010	UGL			
			CA	S	7500.000	CQC			SS10/W	10-DEC-93		7500	UGL			
			CA	S	15000.000	CQC			SS10/W	10-DEC-93		15400	UGL			
			CA	S	15000.000	CQC			SS10/W	10-DEC-93		14700	UGL			
			CD	S	15.000	CQC			SS10/W	10-DEC-93		14.3	UGL			
			CD	S	2000.000	CQC			SS10/W	10-DEC-93		1920	UGL			
			CD	S	4000.000	CQC			SS10/W	10-DEC-93		3800	UGL			
			CD	S	4000.000	CQC			SS10/W	10-DEC-93		3830	UGL			
			CO	S	50.000	CQC			SS10/W	10-DEC-93		52.5	UGL			
			CO	S	20000.000	CQC			SS10/W	10-DEC-93		19000	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Measurement Unit	Flag Codes	Data Quals	Prog
ES	ZFGA		CO	S	40000.000	CQC			SS10/W	10-DEC-93		37000	UGL			
			CO	S	40000.000	CQC			SS10/W	10-DEC-93		37600	UGL			
			CR	S	10.000	CQC			SS10/W	10-DEC-93		10.2	UGL			
			CR	S	2000.000	CQC			SS10/W	10-DEC-93		1920	UGL			
			CR	S	4000.000	CQC			SS10/W	10-DEC-93		3740	UGL			
			CR	S	4000.000	CQC			SS10/W	10-DEC-93		3790	UGL			
			CU	S	20.000	CQC			SS10/W	10-DEC-93		21.7	UGL			
			CU	S	4000.000	CQC			SS10/W	10-DEC-93		3800	UGL			
			CU	S	8000.000	CQC			SS10/W	10-DEC-93		7480	UGL			
			CU	S	8000.000	CQC			SS10/W	10-DEC-93		7600	UGL			
			MG	S	1000.000	CQC			SS10/W	10-DEC-93		961	UGL			
			MG	S	7500.000	CQC			SS10/W	10-DEC-93		7410	UGL			
			MG	S	15000.000	CQC			SS10/W	10-DEC-93		14700	UGL			
			MG	S	15000.000	CQC			SS10/W	10-DEC-93		14600	UGL			
			MN	S	10.000	CQC			SS10/W	10-DEC-93		9.83	UGL			
			MN	S	750.000	CQC			SS10/W	10-DEC-93		739	UGL			
			MN	S	1500.000	CQC			SS10/W	10-DEC-93		1440	UGL			
			MN	S	1500.000	CQC			SS10/W	10-DEC-93		1450	UGL			
			NA	S	1000.000	CQC			SS10/W	10-DEC-93		1010	UGL			
			NA	S	20000.000	CQC			SS10/W	10-DEC-93		19700	UGL			
			NA	S	40000.000	CQC			SS10/W	10-DEC-93		39800	UGL			
			NA	S	40000.000	CQC			SS10/W	10-DEC-93		38800	UGL			
			NI	S	50.000	CQC			SS10/W	10-DEC-93		50.4	UGL			
			NI	S	6000.000	CQC			SS10/W	10-DEC-93		5640	UGL			
			NI	S	12000.000	CQC			SS10/W	10-DEC-93		11000	UGL			
			NI	S	12000.000	CQC			SS10/W	10-DEC-93		11200	UGL			
			ZN	S	40.000	CQC			SS10/W	10-DEC-93		42.2	UGL			
			ZN	S	7500.000	CQC			SS10/W	10-DEC-93		7040	UGL			
			ZN	S	15000.000	CQC			SS10/W	10-DEC-93		13900	UGL			
			ZN	S	15000.000	CQC			SS10/W	10-DEC-93		14000	UGL			
ES	ZFRA		BA	S	10.000	CQC			SS10/W	07-FEB-94		9.53	UGL			
			BA	S	3750.000	CQC			SS10/W	07-FEB-94		3690	UGL			
			BA	S	7500.000	CQC			SS10/W	07-FEB-94		7440	UGL			
			BA	S	7500.000	CQC			SS10/W	07-FEB-94		7470	UGL			
			CA	S	1000.000	CQC			SS10/W	07-FEB-94		1020	UGL			
			CA	S	7500.000	CQC			SS10/W	07-FEB-94		7330	UGL			
			CA	S	15000.000	CQC			SS10/W	07-FEB-94		14700	UGL			
			CA	S	15000.000	CQC			SS10/W	07-FEB-94		14700	UGL			
			CD	S	15.000	CQC			SS10/W	07-FEB-94		14.6	UGL			
			CD	S	2000.000	CQC			SS10/W	07-FEB-94		1960	UGL			
			CD	S	4000.000	CQC			SS10/W	07-FEB-94		3940	UGL			
			CD	S	4000.000	CQC			SS10/W	07-FEB-94		3930	UGL			
			CO	S	50.000	CQC			SS10/W	07-FEB-94		48.2	UGL			
			CO	S	20000.000	CQC			SS10/W	07-FEB-94		19200	UGL			
			CO	S	40000.000	CQC			SS10/W	07-FEB-94		38300	UGL			
			CO	S	40000.000	CQC			SS10/W	07-FEB-94		38300	UGL			
			CR	S	10.000	CQC			SS10/W	07-FEB-94		9.66	UGL			
			CR	S	2000.000	CQC			SS10/W	07-FEB-94		1940	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab	Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Measurement Unit	Flag Codes	Data Quals	Prog
ES	ZFRA		CR	S	4000.000	CQC			SS10/W	07-FEB-94		3900	UGL			
			CR	S	4000.000	CQC			SS10/W	07-FEB-94		3890	UGL			
			CU	S	20.000	CQC			SS10/W	07-FEB-94		20.7	UGL			
			CU	S	4000.000	CQC			SS10/W	07-FEB-94		3910	UGL			
			CU	S	8000.000	CQC			SS10/W	07-FEB-94		7940	UGL			
			CU	S	8000.000	CQC			SS10/W	07-FEB-94		7930	UGL			
			MG	S	1000.000	CQC			SS10/W	07-FEB-94		982	UGL			
			MG	S	7500.000	CQC			SS10/W	07-FEB-94		7370	UGL			
			MG	S	15000.000	CQC			SS10/W	07-FEB-94		14900	UGL			
			MG	S	15000.000	CQC			SS10/W	07-FEB-94		14900	UGL			
			MN	S	10.000	CQC			SS10/W	07-FEB-94		10.4	UGL			
			MN	S	750.000	CQC			SS10/W	07-FEB-94		727	UGL			
			MN	S	1500.000	CQC			SS10/W	07-FEB-94		1470	UGL			
			MN	S	1500.000	CQC			SS10/W	07-FEB-94		1460	UGL			
			NA	S	1000.000	CQC			SS10/W	07-FEB-94		1070	UGL			
			NA	S	20000.000	CQC			SS10/W	07-FEB-94		19400	UGL			
			NA	S	40000.000	CQC			SS10/W	07-FEB-94		38900	UGL			
			NA	S	40000.000	CQC			SS10/W	07-FEB-94		39200	UGL			
			NI	S	50.000	CQC			SS10/W	07-FEB-94		50	UGL			
			NI	S	6000.000	CQC			SS10/W	07-FEB-94		5920	UGL			
			NI	S	12000.000	CQC			SS10/W	07-FEB-94		11900	UGL			
			NI	S	12000.000	CQC			SS10/W	07-FEB-94		11900	UGL			
			ZN	S	40.000	CQC			SS10/W	07-FEB-94		40.5	UGL			
			ZN	S	7500.000	CQC			SS10/W	07-FEB-94		7220	UGL			
			ZN	S	15000.000	CQC			SS10/W	07-FEB-94		14300	UGL			
			ZN	S	15000.000	CQC			SS10/W	07-FEB-94		14300	UGL			
ES	ZFTA		BA	S	10.000	CQC			SS10/W	09-FEB-94		11.3	UGL			
			BA	S	3750.000	CQC			SS10/W	09-FEB-94		3940	UGL			
			BA	S	7500.000	CQC			SS10/W	09-FEB-94		7370	UGL			
			BA	S	7500.000	CQC			SS10/W	09-FEB-94		7410	UGL			
			CA	S	1000.000	CQC			SS10/W	09-FEB-94		1140	UGL			
			CA	S	7500.000	CQC			SS10/W	09-FEB-94		8060	UGL			
			CA	S	15000.000	CQC			SS10/W	09-FEB-94		15000	UGL			
			CA	S	15000.000	CQC			SS10/W	09-FEB-94		15100	UGL			
			CD	S	15.000	CQC			SS10/W	09-FEB-94		15.4	UGL			
			CD	S	2000.000	CQC			SS10/W	09-FEB-94		2060	UGL			
			CD	S	4000.000	CQC			SS10/W	09-FEB-94		3880	UGL			
			CD	S	4000.000	CQC			SS10/W	09-FEB-94		3900	UGL			
			CO	S	50.000	CQC			SS10/W	09-FEB-94		54.3	UGL			
			CO	S	20000.000	CQC			SS10/W	09-FEB-94		20700	UGL			
			CO	S	40000.000	CQC			SS10/W	09-FEB-94		38500	UGL			
			CO	S	40000.000	CQC			SS10/W	09-FEB-94		38700	UGL			
			CR	S	10.000	CQC			SS10/W	09-FEB-94		11	UGL			
			CR	S	2000.000	CQC			SS10/W	09-FEB-94		2090	UGL			
			CR	S	4000.000	CQC			SS10/W	09-FEB-94		3910	UGL			
			CR	S	4000.000	CQC			SS10/W	09-FEB-94		3930	UGL			
			CU	S	20.000	CQC			SS10/W	09-FEB-94		22.7	UGL			
			CU	S	4000.000	CQC			SS10/W	09-FEB-94		4230	UGL			

Chemical Quality Control Report

Installation: Tooele AD (North Area), UT

Analysis Date Range: 01-AUG-93 to 01-MAR-94

Non-Detected Compounds are included

Lab Lot	Field Sample #	Analyte	QC Type	QC Spike	Media Type	Site Type	Site ID	Meth/ Matrix	Analysis Date	Measurement Bool	Measurement Value	Measurement Unit	Flag Codes	Data Quals	Prog
ES ZFTA		CU	S	8000.000	CQC			SS10/W	09-FEB-94		8000	UGL			
		CU	S	8000.000	CQC			SS10/W	09-FEB-94		8030	UGL			
		MG	S	1000.000	CQC			SS10/W	09-FEB-94		1110	UGL			
		MG	S	7500.000	CQC			SS10/W	09-FEB-94		8080	UGL			
		MG	S	15000.000	CQC			SS10/W	09-FEB-94		15200	UGL			
		MG	S	15000.000	CQC			SS10/W	09-FEB-94		15300	UGL			
		MN	S	10.000	CQC			SS10/W	09-FEB-94		11.7	UGL			
		MN	S	750.000	CQC			SS10/W	09-FEB-94		789	UGL			
		MN	S	1500.000	CQC			SS10/W	09-FEB-94		1470	UGL			
		MN	S	1500.000	CQC			SS10/W	09-FEB-94		1480	UGL			
		NA	S	1000.000	CQC			SS10/W	09-FEB-94		1180	UGL			
		NA	S	20000.000	CQC			SS10/W	09-FEB-94		21200	UGL			
		NA	S	40000.000	CQC			SS10/W	09-FEB-94		39500	UGL			
		NA	S	40000.000	CQC			SS10/W	09-FEB-94		39900	UGL			
		NI	S	50.000	CQC			SS10/W	09-FEB-94		51.3	UGL			
		NI	S	6000.000	CQC			SS10/W	09-FEB-94		6380	UGL			
		NI	S	12000.000	CQC			SS10/W	09-FEB-94		11900	UGL			
		NI	S	12000.000	CQC			SS10/W	09-FEB-94		11900	UGL			
		ZN	S	40.000	CQC			SS10/W	09-FEB-94		41.2	UGL			
		ZN	S	7500.000	CQC			SS10/W	09-FEB-94		8040	UGL			
		ZN	S	15000.000	CQC			SS10/W	09-FEB-94		14800	UGL			
		ZN	S	15000.000	CQC			SS10/W	09-FEB-94		14900	UGL			

** End of Report - 1381 Records Found **

ATTACHMENT E-5

FIELD DUPLICATE RESULTS

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 1 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	Low*	SB-20-001A TNSOIL2*1 11/4/93 0.0	 TNSOIL2*67 11/4/93 0.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	5580	9920	56
Barium	20	30	102	123	19
Beryllium	20	30	0.464	0.558	18
Calcium	20	30	12700	5900	73
Cadmium	20	30	ND	ND	NC
Cobalt	20	30	3.62	4.64	25
Copper	20	30	99.9	11.6	158
Iron	20	30	6540	11500	55
Potassium	20	30	1900	2920	42
Magnesium	20	30	4160	4900	16
Manganese	20	30	307	391	24
Sodium	20	30	370	371	0.3
Nickel	20	30	8.23	11.8	36
Antimony	20	30	ND	ND	NC
Thallium	20	30	10.7	11.2	4.6
Zinc	20	30	36.7	46.4	23
Silver	20	30	ND	ND	NC
Chromium	20	30	7.58	12.9	52
Lead	20	30	22.3	16.2	32
Selenium	20	30	ND	ND	NC
Vanadium	20	30	10.9	18.6	52
Arsenic	20	30	3.79	8.45	76
Mercury	20	30	ND	ND	NC
Moisture	20	30	7.9	7.8	1.3

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 2 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SB-20-012A TNSOIL2*34 11/3/93 0.0	 TNSOIL2*65 11/3/93 0.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	5850	3650	46
Barium	20	30	198	72.6	93
Beryllium	20	30	ND	ND	NC
Calcium	20	30	26700	18500	36
Cadmium	20	30	10.9	1.87	141
Cobalt	20	30	2.66	1.93	32
Copper	20	30	318	45.1	150
Iron	20	30	9160	8940	2.4
Potassium	20	30	921	727	24
Magnesium	20	30	3820	2170	55
Manganese	20	30	183	121	41
Sodium	20	30	314	309	1.6
Nickel	20	30	13.2	309	184
Antimony	20	30	17.1	ND	NC
Thallium	20	30	11.3	ND	NC
Zinc	20	30	466	120	118
Silver	20	30	ND	ND	NC
Chromium	20	30	17.1	10.7	46
Lead	20	30	1360	419	106
Selenium	20	30	ND	ND	NC
Vanadium	20	30	9.88	10.7	8.0
Arsenic	20	30	14.0	14.4	2.8
Mercury	20	30	ND	ND	NC
Moisture	20	30	6.4	6.1	4.8

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SB-20-014A TNSOIL2*40 11/3/93 0.0	 TNSOIL2*64 11/3/93 0.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	6820	11500	51
Barium	20	30	90.7	112	21
Beryllium	20	30	0.345	ND	NC
Calcium	20	30	4760	6130	25
Cadmium	20	30	ND	ND	NC
Cobalt	20	30	3.69	4.11	11
Copper	20	30	9.59	12.0	22
Iron	20	30	8150	11700	36
Potassium	20	30	2190	3190	37
Magnesium	20	30	3840	4950	25
Manganese	20	30	277	320	14
Sodium	20	30	307	446	37
Nickel	20	30	9.14	11.1	19
Antimony	20	30	ND	ND	NC
Thallium	20	30	9.51	ND	NC
Zinc	20	30	32.1	41.2	25
Silver	20	30	ND	ND	NC
Chromium	20	30	9.51	ND	NC
Lead	20	30	32.1	41.2	25
Selenium	20	30	ND	ND	NC
Vanadium	20	30	12.5	19.3	43
Arsenic	20	30	5.64	5.37	4.9
Mercury	20	30	ND	ND	NC
Moisture	20	30	7.4	7.1	4.1

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 4 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	Low*	SB-20-015A TNSOIL2*43 11/3/93 0.0	 TNSOIL2*63 11/3/93 0.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	6440	11800	59
Barium	20	30	98	112	13
Beryllium	20	30	0.417	ND	NC
Calcium	20	30	3550	4010	12
Cadmium	20	30	0.483	0.412	16
Cobalt	20	30	3.79	4.56	18
Copper	20	30	13.6	15.2	11
Iron	20	30	7900	12300	44
Potassium	20	30	2200	3390	43
Magnesium	20	30	3380	4380	26
Manganese	20	30	326	344	5.4
Sodium	20	30	336	463	32
Nickel	20	30	8.24	10.8	27
Antimony	20	30	ND	ND	NC
Thallium	20	30	7.45	ND	NC
Zinc	20	30	37.0	47.1	24
Silver	20	30	ND	ND	NC
Chromium	20	30	8.07	14.1	54
Lead	20	30	36.4	35.3	3.1
Selenium	20	30	ND	ND	NC
Vanadium	20	30	11.2	20.8	60
Arsenic	20	30	5.17	5.00	3.3
Mercury	20	30	ND	ND	NC
Moisture	20	30	7.1	7.3	2.8

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

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FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SB-20-017B TNSOIL2*50 11/4/93 1.5	 TNSOIL2*66 11/4/93 1.5	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	6660	6390	4.1
Barium	20	30	86.5	81.5	6.0
Beryllium	20	30	0.345	0.443	25
Calcium	20	30	2900	2810	3.2
Cadmium	20	30	0.584	ND	NC
Cobalt	20	30	4.14	3.63	13
Copper	20	30	11.9	10.5	13
Iron	20	30	9330	8540	8.8
Potassium	20	30	1730	1610	7.2
Magnesium	20	30	2990	2820	5.9
Manganese	20	30	266	262	1.5
Sodium	20	30	319	348	8.7
Nickel	20	30	8.96	9.32	3.9
Antimony	20	30	ND	ND	NC
Thallium	20	30	12.3	9.85	22
Zinc	20	30	54.2	44.9	19
Silver	20	30	ND	ND	NC
Chromium	20	30	10.2	9.32	9.0
Lead	20	30	75.7	56.5	29
Selenium	20	30	ND	ND	NC
Vanadium	20	30	16.3	15.4	5.7
Arsenic	20	30	5.58	6.45	14
Mercury	20	30	ND	ND	NC
Moisture	20	30	7.9	7.7	2.6

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

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High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 6 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	RPD Control Limit (%) Low*	SB-20-019A TNSOIL2*55 11/2/93 0.0	SB-20-019A TNSOIL2*62 11/2/93 0.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	8110	13000	46
Barium	20	30	114	126	10
Beryllium	20	30	ND	ND	NC
Calcium	20	30	2960	3370	13
Cadmium	20	30	ND	ND	NC
Cobalt	20	30	3.60	4.45	21
Copper	20	30	10.5	12.0	13
Iron	20	30	9440	12400	27
Potassium	20	30	2750	3780	32
Magnesium	20	30	4530	5280	15
Manganese	20	30	390	406	4.0
Sodium	20	30	365	477	27
Nickel	20	30	9.59	10.5	9.1
Antimony	20	30	ND	ND	NC
Thallium	20	30	ND	ND	NC
Zinc	20	30	37.5	46.5	21
Silver	20	30	ND	ND	NC
Chromium	20	30	9.5	14.7	43
Lead	20	30	9.25	13.4	37
Selenium	20	30	ND	ND	NC
Vanadium	20	30	14.2	22.4	45
Arsenic	20	30	4.77	6.24	27
Mercury	20	30	ND	ND	NC
Moisture	20	30	6.2	4.8	25

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 7 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SB-34-001A TNSOIL2*70 10/26/93 0.0	 TNSOIL2*115 10/26/93 0.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	0.004	ND	NC
ppDDD	30	50	ND	1.57	NC
ppDDE	30	50	2.47	2.41	2.5
ppDDT	30	50	5.05	5.02	0.6
Dieldrin	30	50	0.068	0.041	50
Endrin	30	50	0.486	ND	NC
Heptachlor	30	50	0.021	0.018	15
a-Chlordane	30	50	1.32	1.38	4.4
g-Chlordane	30	50	1.23	1.29	4.8
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	6150	6040	1.8
Barium	20	30	81.8	82.9	1.3
Beryllium	20	30	0.358	0.425	17
Calcium	20	30	28000	31400	11
Cadmium	20	30	0.532	0.494	7.4
Cobalt	20	30	2.86	2.47	15
Copper	20	30	15.0	17.1	13
Iron	20	30	6600	3480	62
Potassium	20	30	1590	641	85
Magnesium	20	30	4200	3830	9.2
Manganese	20	30	198	94.4	71
Sodium	20	30	402	308	26
Nickel	20	30	8.25	9.25	11
Antimony	20	30	ND	ND	NC
Thallium	20	30	ND	ND	NC
Zinc	20	30	106	109	2.8
Silver	20	30	ND	ND	NC
Chromium	20	30	45.7	12.7	113
Lead	20	30	192	68.5	95
Selenium	20	30	ND	ND	NC
Vanadium	20	30	10.7	9.97	7.1
Arsenic	20	30	10.8	9.44	13
Mercury	20	30	ND	ND	NC
Moisture	20	30	7.2	7.0	2.8

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

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High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 8 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SB-34-008B TNSOIL2*98 10/25/93 1.5	 TNSOIL2*112 10/25/93 1.5	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	ND	ND	NC
ppDDD	30	50	ND	ND	NC
ppDDE	30	50	0.004	ND	NC
ppDDT	30	50	ND	ND	NC
Dieldrin	30	50	ND	ND	NC
Endrin	30	50	ND	ND	NC
Heptachlor	30	50	ND	ND	NC
a-Chlordane	30	50	ND	ND	NC
g-Chlordane	30	50	ND	ND	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	2260	1260	57
Barium	20	30	32.0	32.2	0.6
Beryllium	20	30	0.468	ND	NC
Calcium	20	30	20800	39900	63
Cadmium	20	30	ND	ND	NC
Cobalt	20	30	2.27	6.29	94
Copper	20	30	17.1	53.4	103
Iron	20	30	3480	20000	141
Potassium	20	30	641	389	49
Magnesium	20	30	3830	4810	23
Manganese	20	30	94.4	244	88
Sodium	20	30	308	311	1.0
Nickel	20	30	9.25	357	190
Antimony	20	30	ND	ND	NC
Thallium	20	30	13.4	19.6	38
Zinc	20	30	18.4	13.0	34
Silver	20	30	ND	ND	NC
Chromium	20	30	7.47	179	184
Lead	20	30	ND	ND	NC
Selenium	20	30	0.438	0.270	47
Vanadium	20	30	8.14	6.30	25
Arsenic	20	30	3.23	2.67	19
Mercury	20	30	ND	ND	NC
Moisture	20	30	4.9	4.9	<1.0

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

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ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 9 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	Low*	SB-34-009A TNSOIL2*100 10/25/93 0.0	 TNSOIL2*113 10/25/93 0.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	ND	ND	NC
ppDDD	30	50	ND	ND	NC
ppDDE	30	50	0.633	0.750	17
ppDDT	30	50	1.32	1.24	6.3
Dieldrin	30	50	ND	ND	NC
Endrin	30	50	ND	ND	NC
Heptachlor	30	50	0.061	0.066	7.9
a-Chlordane	30	50	0.782	0.921	16
g-Chlordane	30	50	1.03	1.20	15
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	7220	5030	36
Barium	20	30	96.8	85.2	13
Beryllium	20	30	0.563	0.497	12
Calcium	20	30	3340	4090	20
Cadmium	20	30	ND	0.53	NC
Cobalt	20	30	4.07	3.52	14
Copper	20	30	12.1	14.9	21
Iron	20	30	8080	5890	31
Potassium	20	30	2300	1740	28
Magnesium	20	30	3200	2550	23
Manganese	20	30	337	308	9.0
Sodium	20	30	322	278	15
Nickel	20	30	9.14	7.75	16
Antimony	20	30	ND	ND	NC
Thallium	20	30	13.8	11.9	15
Zinc	20	30	51.7	57.7	11
Silver	20	30	ND	ND	NC
Chromium	20	30	10.6	8.24	25
Lead	20	30	32.1	48.4	40
Selenium	20	30	ND	0.437	NC
Vanadium	20	30	12.4	9.42	27
Arsenic	20	30	5.90	4.92	18
Mercury	20	30	ND	ND	NC
Moisture	20	30	9.8	10.0	2.0

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

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ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 10 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SB-37-006A TNSOIL2*144 10/6/93 0.0	 TNSOIL2*151 10/6/93 0.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	ND	ND	NC
Benzo(b)fluoranthene	30	50	ND	0.27	NC
Benzo(k)fluoranthene	30	50	0.07	0.14	67
Chrysene	30	50	0.31	0.32	3.2
Di-n-butyl phthalate	30	50	0.08	1.9	184
Fluoranthene	30	50	0.54	0.57	5.4
Phenanthrene	30	50	0.22	0.33	40
Pyrene	30	50	0.30	0.34	13
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	9.40E-05	1.70E-04	58
2,3,7,8-TCDF	30	50	2.70E-06	5.80E-06	73
PeCDFs (total)	30	50	1.50E-04	3.00E-04	67
1,2,3,7,8,-PeCDF	30	50	9.00E-06	1.50E-05	50
2,3,4,7,8-PeCDF	30	50	1.90E-05	3.00E-05	45
HxCDFs (total)	30	50	2.60E-04	3.40E-04	27
1,2,3,4,7,8-HxCDF	30	50	2.90E-05	<5.40E-05	NC
1,2,3,6,7,8-HxCDF	30	50	2.00E-05	3.20E-05	46
2,3,4,6,7,8-HxCDF	30	50	2.40E-05	2.70E-05	12
1,2,3,7,8,9-HxCDF	30	50	1.40E-05	1.50E-05	7
HpCDFs (total)	30	50	3.90E-04	5.20E-04	29
1,2,3,4,6,7,8-HpCDF	30	50	1.20E-04	1.60E-04	29
1,2,3,4,7,8,9-HpCDF	30	50	4.50E-05	5.00E-05	11
OCDF	30	50	3.20E-04	4.30E-04	29
TCDD (total)	30	50	6.60E-05	1.00E-04	41
2,3,7,8-TCDD	30	50	3.90E-06	4.50E-06	14
PeCDDs (total)	30	50	2.50E-04	3.90E-04	44
1,2,3,7,8-PeCDD	30	50	3.60E-05	5.20E-05	36
HxCDDs (total)	30	50	8.80E-04	1.30E-03	39
1,2,3,4,7,8-HxCDD	30	50	7.10E-05	1.00E-04	34
1,2,3,6,7,8_HxCDD	30	50	1.10E-04	1.60E-04	37
1,2,3,7,8,9-HxCDD	30	50	1.10E-04	1.10E-04	0
HpCDDs (total)	30	50	3.20E-03	4.30E-03	29
1,2,3,4,6,7,8-HpCDD	30	50	1.80E-03	2.40E-03	29
OCDD	30	50	7.00E-03	7.80E-03	11
Metals (µg/g)					
Aluminum	20	30	NA	NA	NC
Barium	20	30	NA	NA	NC
Beryllium	20	30	NA	NA	NC
Calcium	20	30	NA	NA	NC
Cadmium	20	30	NA	NA	NC
Cobalt	20	30	NA	NA	NC
Copper	20	30	NA	NA	NC
Iron	20	30	NA	NA	NC
Potassium	20	30	NA	NA	NC
Magnesium	20	30	NA	NA	NC
Manganese	20	30	NA	NA	NC
Sodium	20	30	NA	NA	NC
Nickel	20	30	NA	NA	NC
Antimony	20	30	NA	NA	NC
Thallium	20	30	NA	NA	NC
Zinc	20	30	NA	NA	NC
Silver	20	30	NA	NA	NC
Chromium	20	30	NA	NA	NC
Lead	20	30	NA	NA	NC
Selenium	20	30	NA	NA	NC
Vanadium	20	30	NA	NA	NC
Arsenic	20	30	NA	NA	NC
Mercury	20	30	NA	NA	NC
Moisture	20	30	1.9	1.9	<1.0

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
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Shading denotes RPDs that exceed the control limits.

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ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 11 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SB-37-006C TNSOIL2*146 10/6/93 3.0	 TNSOIL2*152 10/6/93 3.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	0.05	ND	NC
Benzo(b)fluoranthene	30	50	0.46	ND	NC
Benzo(k)fluoranthene	30	50	0.14	ND	NC
Chrysene	30	50	0.32	ND	NC
Di-n-butyl phthalate	30	50	0.37	1.3	111
Fluoranthene	30	50	0.51	0.12	124
Phenanthrene	30	50	0.24	0.06	120
Pyrene	30	50	0.29	0.06	131
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	5.90E-05	5.90E-06	164
2,3,7,8-TCDF	30	50	1.60E-06	<3.60E-07	NC
PeCDFs (total)	30	50	1.10E-04	<4.20E-06	NC
1,2,3,7,8,-PeCDF	30	50	6.50E-05	<1.30E-06	NC
2,3,4,7,8-PeCDF	30	50	1.30E-05	<3.30E-06	NC
HxCDFs (total)	30	50	1.40E-04	2.60E-05	137
1,2,3,4,7,8-HxCDF	30	50	1.90E-05	<6.10E-06	NC
1,2,3,6,7,8-HxCDF	30	50	1.30E-05	<3.60E-06	NC
2,3,4,6,7,8-HxCDF	30	50	1.40E-05	<3.80E-06	NC
1,2,3,7,8,9-HxCDF	30	50	9.20E-06	<2.00E-06	NC
HpCDFs (total)	30	50	1.50E-04	7.60E-05	65
1,2,3,4,6,7,8-HpCDF	30	50	4.70E-05	2.50E-05	61
1,2,3,4,7,8,9-HpCDF	30	50	2.10E-05	8.20E-06	88
OCDF	30	50	9.80E-05	7.90E-05	21
TCDD (total)	30	50	3.00E-05	1.00E-06	187
2,3,7,8-TCDD	30	50	1.70E-06	<8.70E-07	NC
PeCDDs (total)	30	50	1.70E-04	<4.70E-06	NC
1,2,3,7,8-PeCDD	30	50	2.30E-05	<4.70E-06	NC
HxCDDs (total)	30	50	3.30E-04	1.40E-04	81
1,2,3,4,7,8-HxCDD	30	50	4.30E-05	1.30E-05	107
1,2,3,6,7,8_HxCDD	30	50	6.40E-05	2.10E-05	101
1,2,3,7,8,9-HxCDD	30	50	6.00E-05	1.50E-05	120
HpCDDs (total)	30	50	1.20E-03	6.90E-04	54
1,2,3,4,6,7,8-HpCDD	30	50	6.90E-04	3.90E-04	56
OCDD	30	50	1.80E-03	1.40E-03	25
Metals (µg/g)					
Aluminum	20	30	NA	NA	NC
Barium	20	30	NA	NA	NC
Beryllium	20	30	NA	NA	NC
Calcium	20	30	NA	NA	NC
Cadmium	20	30	NA	NA	NC
Cobalt	20	30	NA	NA	NC
Copper	20	30	NA	NA	NC
Iron	20	30	NA	NA	NC
Potassium	20	30	NA	NA	NC
Magnesium	20	30	NA	NA	NC
Manganese	20	30	NA	NA	NC
Sodium	20	30	NA	NA	NC
Nickel	20	30	NA	NA	NC
Antimony	20	30	NA	NA	NC
Thallium	20	30	NA	NA	NC
Zinc	20	30	NA	NA	NC
Silver	20	30	NA	NA	NC
Chromium	20	30	NA	NA	NC
Lead	20	30	NA	NA	NC
Selenium	20	30	NA	NA	NC
Vanadium	20	30	NA	NA	NC
Arsenic	20	30	NA	NA	NC
Mercury	20	30	NA	NA	NC
Moisture	20	30	3.7	3.7	<1.0

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 12 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	RPD Control Limit (%) Low*	SB-42-014B TNSOIL2*164 11/4/93 37.0	SB-42-014B TNSOIL2*290 11/4/93 37.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	4400	2920	40
Barium	20	30	217	286	27
Beryllium	20	30	ND	ND	NC
Calcium	20	30	51100	48300	5.6
Cadmium	20	30	ND	ND	NC
Cobalt	20	30	2.69	2.42	11
Copper	20	30	6.02	5.65	6.3
Iron	20	30	6640	5820	13
Potassium	20	30	1290	924	33
Magnesium	20	30	5240	4660	12
Manganese	20	30	198	178	11
Sodium	20	30	315	362	14
Nickel	20	30	9.18	7.37	22
Antimony	20	30	ND	ND	NC
Thallium	20	30	18.4	11.8	44
Zinc	20	30	23.5	19.7	18
Silver	20	30	ND	ND	NC
Chromium	20	30	9.63	8.03	18
Lead	20	30	7.10	9.31	27
Selenium	20	30	ND	ND	NC
Vanadium	20	30	14.8	12.1	20
Arsenic	20	30	13.8	12.3	11
Mercury	20	30	ND	ND	NC
Moisture	20	30	14.7	15.4	4.7

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 13 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SB-42-015A TNSOIL2*168 11/5/93 17.0	 TNSOIL2*291 11/5/93 17.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	1250	1420	13
Barium	20	30	18.3	24.0	27
Beryllium	20	30	ND	ND	NC
Calcium	20	30	36900	38100	3.2
Cadmium	20	30	ND	ND	NC
Cobalt	20	30	1.07	1.35	23
Copper	20	30	2.69	3.09	14
Iron	20	30	2360	2570	8.5
Potassium	20	30	382	435	13
Magnesium	20	30	3450	3850	11
Manganese	20	30	67.7	91.1	29
Sodium	20	30	233	286	20
Nickel	20	30	4.74	5.32	12
Antimony	20	30	ND	ND	NC
Thallium	20	30	11.7	10.3	13
Zinc	20	30	11.0	12.1	10
Silver	20	30	ND	ND	NC
Chromium	20	30	4.47	4.75	6.1
Lead	20	30	ND	ND	NC
Selenium	20	30	ND	ND	NC
Vanadium	20	30	5.07	4.63	9.1
Arsenic	20	30	2.66	3.05	14
Mercury	20	30	ND	ND	NC
Moisture	20	30	5.8	5.0	15

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 14 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	Low*	SB-42-017C TNSOIL2*180 11/8/93 37.0	 TNSOIL2*292 11/8/93 37.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	4870	3190	42
Barium	20	30	188	54.8	110
Beryllium	20	30	0.352	ND	NC
Calcium	20	30	63300	58000	8.7
Cadmium	20	30	ND	ND	NC
Cobalt	20	30	2.94	3.34	13
Copper	20	30	29.9	6.49	129
Iron	20	30	8190	5430	41
Potassium	20	30	1390	1010	32
Magnesium	20	30	7010	5880	18
Manganese	20	30	128	168	27
Sodium	20	30	473	528	11
Nickel	20	30	8.19	8.44	3.0
Antimony	20	30	ND	ND	NC
Thallium	20	30	16.5	14.2	15
Zinc	20	30	51.7	23.2	76
Silver	20	30	ND	ND	NC
Chromium	20	30	12.3	7.67	46
Lead	20	30	124	ND	NC
Selenium	20	30	ND	ND	NC
Vanadium	20	30	15.4	10.7	36
Arsenic	20	30	5.00	5.47	9.0
Mercury	20	30	ND	ND	NC
Moisture	20	30	22.7	21.9	3.6

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 15 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SB-42-018A TNSOIL2*183 10/12/93 0.0	 TNSOIL2*271 10/12/93 0.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	11200	10100	10
Barium	20	30	117	111	5.3
Beryllium	20	30	0.562	ND	NC
Calcium	20	30	2700	2540	6.1
Cadmium	20	30	0.672	ND	NC
Cobalt	20	30	4.87	4.58	6.1
Copper	20	30	18.4	17.4	5.6
Iron	20	30	11100	10600	4.6
Potassium	20	30	3410	3130	8.6
Magnesium	20	30	4300	4050	6.0
Manganese	20	30	377	372	1.3
Sodium	20	30	324	299	8.0
Nickel	20	30	10.8	10.4	3.8
Antimony	20	30	ND	ND	NC
Thallium	20	30	9.88	10.7	8.0
Zinc	20	30	63.0	60.9	3.4
Silver	20	30	ND	ND	NC
Chromium	20	30	15.0	13.9	7.6
Lead	20	30	52.3	48.7	7.1
Selenium	20	30	ND	ND	NC
Vanadium	20	30	17.5	16.3	7.1
Arsenic	20	30	9.13	8.55	6.6
Mercury	20	30	ND	ND	NC
Moisture	20	30	5.4	4.4	20

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

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High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 16 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SB-42-021B TNSOIL2*196 10/13/93 4.0	 TNSOIL2*272 10/13/93 4.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	1460	861	52
Barium	20	30	42.4	26.9	45
Beryllium	20	30	ND	ND	NC
Calcium	20	30	67500	87000	25
Cadmium	20	30	ND	ND	NC
Cobalt	20	30	0.945	0.843	11
Copper	20	30	2.63	1.46	57
Iron	20	30	2350	1570	40
Potassium	20	30	441	283	44
Magnesium	20	30	6180	4530	31
Manganese	20	30	64.8	53.0	20
Sodium	20	30	318	263	19
Nickel	20	30	3.98	3.10	25
Antimony	20	30	ND	ND	NC
Thallium	20	30	13.0	13.8	6.0
Zinc	20	30	10.8	6.6	48
Silver	20	30	ND	ND	NC
Chromium	20	30	8.72	5.85	39
Lead	20	30	8.45	ND	NC
Selenium	20	30	ND	ND	NC
Vanadium	20	30	7.32	4.04	58
Arsenic	20	30	4.37	3.41	25
Mercury	20	30	ND	ND	NC
Moisture	20	30	4.1	3.8	7.6

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

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High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 17 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%)		SB-42-025D		Relative Percent Difference (%)
	High*	Low*	TNSOIL2*214 10/14/93 10.0	TNSOIL2*273 10/14/93 10.0	
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	792	1380	54
Barium	20	30	18.9	28.6	41
Beryllium	20	30	ND	ND	NC
Calcium	20	30	42000	63600	41
Cadmium	20	30	ND	ND	NC
Cobalt	20	30	0.820	0.868	5.7
Copper	20	30	2.58	2.48	4.0
Iron	20	30	2360	2630	11
Potassium	20	30	231	412	56
Magnesium	20	30	6230	5890	5.6
Manganese	20	30	93	103	10
Sodium	20	30	313	339	8.0
Nickel	20	30	4.24	4.40	3.7
Antimony	20	30	ND	ND	NC
Thallium	20	30	4.09	17	122
Zinc	20	30	8.1	10.1	22
Silver	20	30	ND	ND	NC
Chromium	20	30	6.20	7.35	17
Lead	20	30	ND	ND	NC
Selenium	20	30	ND	ND	NC
Vanadium	20	30	4.26	4.96	15
Arsenic	20	30	2.46	2.30	6.7
Mercury	20	30	ND	ND	NC
Moisture	20	30	3.5	4.0	13

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 18 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	RPD Control Limit (%) Low*	SB-42-027D TNSOIL2*222 10/19/93 10.0	SB-42-027D TNSOIL2*274 10/19/93 10.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	765	1000	27
Barium	20	30	19.6	25.6	27
Beryllium	20	30	ND	ND	NC
Calcium	20	30	92700	80600	14
Cadmium	20	30	ND	ND	NC
Cobalt	20	30	ND	ND	NC
Copper	20	30	2.97	4.01	30
Iron	20	30	1860	2620	34
Potassium	20	30	166	305	59
Magnesium	20	30	4830	5310	9.5
Manganese	20	30	51.9	61.6	17
Sodium	20	30	351	296	17
Nickel	20	30	6.12	14.6	82
Antimony	20	30	ND	ND	NC
Thallium	20	30	5.96	14.1	81
Zinc	20	30	10.5	8.28	24
Silver	20	30	ND	ND	NC
Chromium	20	30	6.88	12.3	57
Lead	20	30	ND	ND	NC
Selenium	20	30	ND	ND	NC
Vanadium	20	30	3.55	4.32	20
Arsenic	20	30	2.57	2.47	4.0
Mercury	20	30	ND	ND	NC
Moisture	20	30	3.6	3.7	2.7

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 19 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SB-42-033A TNSOIL2*237 10/20/93 0.0	 TNSOIL2*275 10/20/93 0.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	10200	9210	10
Barium	20	30	1090	977	11
Beryllium	20	30	0.454	0.459	1.1
Calcium	20	30	7750	7610	1.8
Cadmium	20	30	0.687	ND	NC
Cobalt	20	30	3.97	3.76	5.4
Copper	20	30	16.5	14.1	16
Iron	20	30	10000	9530	4.8
Potassium	20	30	3120	2840	9.4
Magnesium	20	30	4000	3640	9.4
Manganese	20	30	291	279	4.2
Sodium	20	30	384	357	7.3
Nickel	20	30	9.45	9.27	1.9
Antimony	20	30	ND	ND	NC
Thallium	20	30	11.1	10.0	10
Zinc	20	30	64.6	53.4	19
Silver	20	30	ND	ND	NC
Chromium	20	30	14.7	13.6	7.8
Lead	20	30	60.2	46.6	25
Selenium	20	30	ND	ND	NC
Vanadium	20	30	17.6	15.9	10
Arsenic	20	30	8.67	8.07	7.2
Mercury	20	30	ND	ND	NC
Moisture	20	30	7.7	7.3	5.3

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 20 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	RPD Control Limit (%) Low*	SB-42-037A TNSOIL2*245 10/21/93 0.0	SB-42-037A TNSOIL2*276 10/21/93 0.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	5830	8690	39
Barium	20	30	107	102	4.8
Beryllium	20	30	0.465	0.390	18
Calcium	20	30	83600	88300	5.5
Cadmium	20	30	ND	ND	NC
Cobalt	20	30	3.59	3.71	3.3
Copper	20	30	7.33	117	176
Iron	20	30	8180	13500	49
Potassium	20	30	2430	1250	64
Magnesium	20	30	8170	3670	76
Manganese	20	30	182	169	7.4
Sodium	20	30	867	770	12
Nickel	20	30	8.88	8.83	0.6
Antimony	20	30	ND	ND	NC
Thallium	20	30	19.7	21.1	6.9
Zinc	20	30	27.1	29.7	9.2
Silver	20	30	ND	ND	NC
Chromium	20	30	9.15	12.6	32
Lead	20	30	10.5	9.08	15
Selenium	20	30	ND	ND	NC
Vanadium	20	30	13.9	18.0	26
Arsenic	20	30	18.0	5.85	102
Mercury	20	30	ND	ND	NC
Moisture	20	30	11.6	11.4	1.7

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SB-42-049A TNSOIL2*269 10/22/93 0.0	 TNSOIL2*277 10/22/93 0.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	ND	ND	NC
Benzo(b)fluoranthene	30	50	ND	ND	NC
Benzo(k)fluoranthene	30	50	ND	ND	NC
Chrysene	30	50	ND	ND	NC
Di-n-butyl phthalate	30	50	ND	ND	NC
Fluoranthene	30	50	ND	ND	NC
Phenanthrene	30	50	ND	ND	NC
Pyrene	30	50	ND	ND	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	5090	5860	14
Barium	20	30	109	115	5.4
Beryllium	20	30	0.622	0.412	41
Calcium	20	30	16000	20800	26
Cadmium	20	30	3.96	4.23	6.6
Cobalt	20	30	4.02	4.10	2.0
Copper	20	30	117	1710	174
Iron	20	30	13500	17500	26
Potassium	20	30	1250	1280	2.4
Magnesium	20	30	3670	4410	18
Manganese	20	30	229	259	12
Sodium	20	30	775	925	18
Nickel	20	30	14.0	24.8	56
Antimony	20	30	ND	ND	NC
Thallium	20	30	ND	8.02	NC
Zinc	20	30	335	337	0.6
Silver	20	30	ND	0.74	NC
Chromium	20	30	33.7	33.6	0.3
Lead	20	30	295	425	36
Selenium	20	30	ND	ND	NC
Vanadium	20	30	10.9	19.7	58
Arsenic	20	30	13.5	20.2	40
Mercury	20	30	0.121	0.196	47
Moisture	20	30	14.2	15.7	10

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

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High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 22 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SS-37-014 TNSOIL2*121 10/5/93 0.0	 TNSOIL2*128 10/5/93 0.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	ND	ND	NC
Benzo(b)fluoranthene	30	50	ND	ND	NC
Benzo(k)fluoranthene	30	50	ND	ND	NC
Chrysene	30	50	ND	ND	NC
Di-n-butyl phthalate	30	50	0.58	0.29	67
Fluoranthene	30	50	ND	ND	NC
Phenanthrene	30	50	ND	ND	NC
Pyrene	30	50	ND	ND	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	<2.10E-07	<1.30E-07	NC
2,3,7,8-TCDF	30	50	<1.50E-07	<9.40E-08	NC
PeCDFs (total)	30	50	<2.60E-07	<1.40E-07	NC
1,2,3,7,8,-PeCDF	30	50	<1.70E-07	<1.40E-07	NC
2,3,4,7,8-PeCDF	30	50	<2.60E-07	<1.40E-07	NC
HxCDFs (total)	30	50	<2.40E-07	<2.90E-07	NC
1,2,3,4,7,8-HxCDF	30	50	<2.40E-07	<1.90E-07	NC
1,2,3,6,7,8-HxCDF	30	50	<2.20E-07	<8.60E-08	NC
2,3,4,6,7,8-HxCDF	30	50	<1.60E-07	<1.40E-07	NC
1,2,3,7,8,9-HxCDF	30	50	<2.30E-07	<2.20E-07	NC
HpCDFs (total)	30	50	<5.50E-07	<8.20E-07	NC
1,2,3,4,6,7,8-HpCDF	30	50	<5.50E-07	<8.20E-07	NC
1,2,3,4,7,8,9-HpCDF	30	50	<2.00E-07	<3.30E-07	NC
OCDF	30	50	<9.50E-07	<2.50E-06	NC
TCDD (total)	30	50	<1.90E-07	<2.30E-07	NC
2,3,7,8-TCDD	30	50	<1.40E-07	<1.90E-07	NC
PeCDDs (total)	30	50	<1.50E-06	<3.10E-07	NC
1,2,3,7,8-PeCDD	30	50	<3.40E-07	<1.50E-07	NC
HxCDDs (total)	30	50	<4.40E-07	<4.00E-07	NC
1,2,3,4,7,8-HxCDD	30	50	<4.40E-07	<1.10E-07	NC
1,2,3,6,7,8_HxCDD	30	50	<3.80E-07	<1.80E-07	NC
1,2,3,7,8,9-HxCDD	30	50	<3.50E-07	<1.30E-07	NC
HpCDDs (total)	30	50	<1.20E-06	<2.10E-06	NC
1,2,3,4,6,7,8-HpCDD	30	50	<1.20E-06	<2.10E-06	NC
OCDD	30	50	<7.00E-06	1.00E-05	NC
Metals (µg/g)					
Aluminum	20	30	NA	NA	NC
Barium	20	30	NA	NA	NC
Beryllium	20	30	NA	NA	NC
Calcium	20	30	NA	NA	NC
Cadmium	20	30	NA	NA	NC
Cobalt	20	30	NA	NA	NC
Copper	20	30	NA	NA	NC
Iron	20	30	NA	NA	NC
Potassium	20	30	NA	NA	NC
Magnesium	20	30	NA	NA	NC
Manganese	20	30	NA	NA	NC
Sodium	20	30	NA	NA	NC
Nickel	20	30	NA	NA	NC
Antimony	20	30	NA	NA	NC
Thallium	20	30	NA	NA	NC
Zinc	20	30	NA	NA	NC
Silver	20	30	NA	NA	NC
Chromium	20	30	NA	NA	NC
Lead	20	30	NA	NA	NC
Selenium	20	30	NA	NA	NC
Vanadium	20	30	NA	NA	NC
Arsenic	20	30	NA	NA	NC
Mercury	20	30	NA	NA	NC
Moisture	20	30	0.7	0.7	<1.0

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 23 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SS-BK-001 TNSOIL2*161 10/23/93 0.0	 TNSOIL2*162 10/23/93 0.0	Relative Percent Difference (%)
SVOCs (µg/g)					
Anthracene	30	50	NA	NA	NC
Benzo(b)fluoranthene	30	50	NA	NA	NC
Benzo(k)fluoranthene	30	50	NA	NA	NC
Chrysene	30	50	NA	NA	NC
Di-n-butyl phthalate	30	50	NA	NA	NC
Fluoranthene	30	50	NA	NA	NC
Phenanthrene	30	50	NA	NA	NC
Pyrene	30	50	NA	NA	NC
OC Pesticides/PCBs (µg/g)					
Lindane	30	50	NA	NA	NC
ppDDD	30	50	NA	NA	NC
ppDDE	30	50	NA	NA	NC
ppDDT	30	50	NA	NA	NC
Dieldrin	30	50	NA	NA	NC
Endrin	30	50	NA	NA	NC
Heptachlor	30	50	NA	NA	NC
a-Chlordane	30	50	NA	NA	NC
g-Chlordane	30	50	NA	NA	NC
Dioxin Furan (µg/g)					
TCDFs (total)	30	50	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC
OCDF	30	50	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC
OCDD	30	50	NA	NA	NC
Metals (µg/g)					
Aluminum	20	30	5170	4580	12
Barium	20	30	69.9	63.9	9.0
Beryllium	20	30	ND	ND	NC
Calcium	20	30	2970	14500	132
Cadmium	20	30	1.76	1.43	21
Cobalt	20	30	2.56	2.45	4.4
Copper	20	30	30.0	25.3	17
Iron	20	30	6550	5640	15
Potassium	20	30	1670	1540	8.1
Magnesium	20	30	3150	3610	14
Manganese	20	30	353	300	16
Sodium	20	30	298	284	4.8
Nickel	20	30	6.23	5.37	15
Antimony	20	30	ND	ND	NC
Thallium	20	30	10.3	12.5	19
Zinc	20	30	147	110	29
Silver	20	30	ND	ND	NC
Chromium	20	30	7.77	7.04	10
Lead	20	30	156	126	21
Selenium	20	30	0.241	0.500	70
Vanadium	20	30	8.62	8.48	1.6
Arsenic	20	30	40.0	37.8	5.7
Mercury	20	30	ND	ND	NC
Moisture	20	30	8.1	8.5	4.8

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected
SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls

Shading denotes RPDs that exceed the control limits.

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5a

FIELD DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES
(Page 24 of 24)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	 Low*	SS-20-020 UC 02638 8/8/95 0.0	 UC 02643 8/8/95 0.0	Relative Percent Difference (%)
Metals (µg/g)					
Chromium	20	30	16.92	9.96	52
Hexavalent Chromium	20	30	2.94	3.08	5

RPD - Relative Percent Difference

* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5b

SUMMARY OF FIELD DUPLICATES FOR GROUNDWATER SAMPLES

Sample ID Laboratory ID Date Sampled	RPD Control Limit (%) High*	 Low*	N-142-93 TNWTR2*70 2/1/94	 TNWTR2*76 2/1/94	Relative Percent Difference (%)
VOCs (µg/L)					
Chloroform	20	40	ND	0.7 U	NC
Metals (µg/L)					
Selenium	10	25	4.7	3.6	27
Arsenic	10	25	ND	2.77	NC
Barium	10	25	29.2	29.4	0.7
Calcium	10	25	177000	180000	1.7
Chromium	10	25	60.3	56.2	7.0
Iron	10	25	339	341	0.6
Potassium	10	25	7090	7440	4.8
Magnesium	10	25	84400	85700	1.5
Manganese	10	25	12.0	13.1	8.8
Sodium	10	25	143000	144000	0.7
Zinc	10	25	85.0	90.4	6.2
Water Quality Parameters	10	25			
Alkalinity, Bicarbonate (mg/L)	10	25	220	222	0.9
Alkalinity, Total (mg/L)	10	25	220	222	0.9
Sulfate (µg/L)	10	25	314000	322000	2.5
Chloride (µg/L)	10	25	497000	477000	4.1
Total Dissolved Solids (mg/L)	10	25	1420	1410	0.7

RPD - Relative Percent Difference
NC - Not Calculated
ND - Not Detected
VOCs - Volatile Organic Compounds
U - Qualified as nondetect based on the associated method blank results.

Shading denotes RPDs that exceed the control limits.
* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5c

SUMMARY OF RPDs FOR SOIL FIELD DUPLICATE SAMPLES

Parameter	Number of RPDs Calculated	Number of RPDs Exceeding Control Limits	Percent of RPDs Exceeding Control Limits
Semivolatile Organic Compounds			
Benzo(k)fluoranthene	1	1	100%
Chrysene	1	0	0%
Di-n-butyl phthalate	3	3	100%
Fluoranthene	2	1	50%
Phenanthrene	2	1	50%
Pyrene	2	1	50%
Organochlorine Pesticides			
4,4'-DDE	2	0	0%
4,4'-DDT	2	0	0%
Dieldrin	1	0	0%
Heptachlor	2	0	0%
alpha-Chlordane	2	0	0%
gamma-Chlordane	2	0	0%
Dioxin/Furans			
TCDFs (total)	2	2	100%
2,3,7,8-TCDF	1	1	100%
PeCDFs (total)	1	1	100%
1,2,3,7,8,-PeCDF	1	0	0%
2,3,4,7,8-PeCDF	1	0	0%
HxCDFs (total)	2	1	50%
1,2,3,4,7,8-HxCDF	0	0	NC
1,2,3,6,7,8-HxCDF	1	0	0%
2,3,4,6,7,8-HxCDF	1	0	0%
1,2,3,7,8,9-HxCDF	1	0	0%
HpCDFs (total)	2	1	50%
1,2,3,4,6,7,8-HpCDF	2	1	50%
1,2,3,4,7,8,9-HpCDF	2	1	50%
OCDF	2	0	0%
TCDD (total)	2	1	50%
2,3,7,8-TCDD	1	0	0%
PeCDDs (total)	1	0	0%
1,2,3,7,8-PeCDD	1	0	0%
HxCDDs (total)	2	1	50%
1,2,3,4,7,8-HxCDD	2	1	50%
1,2,3,6,7,8_HxCDD	2	1	50%
1,2,3,7,8,9-HxCDD	2	1	50%
HpCDDs (total)	2	1	50%
1,2,3,4,6,7,8-HpCDD	2	1	50%
OCDD	2	0	0%

ATTACHMENT E-5c

SUMMARY OF RPDs FOR SOIL FIELD DUPLICATE SAMPLES
(Page 2 of 2)

Parameter	Number of RPDs Calculated	Number of RPDs Exceeding Control Limits	Percent of RPDs Exceeding Control Limits
Metals			
Aluminum	20	13	65%
Barium	20	6	30%
Beryllium	7	1	14%
Calcium	20	7	35%
Cadmium	5	1	20%
Cobalt	19	2	11%
Copper	20	8	40%
Iron	20	12	60%
Potassium	20	13	65%
Magnesium	20	7	35%
Manganese	20	6	30%
Sodium	20	2	10%
Nickel	20	5	25%
Antimony	0	0	NC
Thallium	14	4	29%
Zinc	20	6	30%
Silver	0	0	NC
Chromium	19	10	53%
Lead	14	6	43%
Selenium	2	2	100%
Vanadium	20	7	35%
Arsenic	20	5	25%
Mercury	1	1	100%
Moisture	23	1	4%

RPD: Relative Percent Difference
NC: Not Calculated

ATTACHMENT E-5d
FIELD DUPLICATE SAMPLE SUMMARY FOR ADDENDUM SOIL SAMPLES
(Page 1 of 3)

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	RPD Control Limit (%) Low*	SB-42-050A TNSOIL2*315 5/31/94 0.5	SB-42-050A TNSOIL2*319 5/31/94 0.5	Relative Percent Difference (%)	SB-45-007B TNSOIL2*331 5/25/94 12.0	SB-45-007B TNSOIL2*360 5/25/94 12.0	Relative Percent Difference (%)
VOCs (µg/g)								
Trichlorofluoromethane			ND	ND	NC	ND	ND	NC
SVOCs (µg/g)								
Anthracene	30	50	ND	ND	NC	ND	ND	NC
Benzo(b)fluoranthene	30	50	ND	ND	NC	ND	ND	NC
Benzo(k)fluoranthene	30	50	ND	ND	NC	ND	ND	NC
Chrysene	30	50	ND	ND	NC	ND	ND	NC
Di-n-butyl phthalate	30	50	0.09	ND	NC	ND	ND	NC
Fluoranthene	30	50	ND	ND	NC	ND	ND	NC
Phenanthrene	30	50	ND	ND	NC	ND	ND	NC
Pyrene	30	50	0.05	ND	NC	ND	ND	NC
OC Pesticides/PCBs (µg/g)								
Lindane	30	50	NA	NA	NC	ND	ND	NC
ppDDD	30	50	NA	NA	NC	ND	ND	NC
ppDDE	30	50	NA	NA	NC	ND	ND	NC
ppDDT	30	50	NA	NA	NC	ND	ND	NC
Dieldrin	30	50	NA	NA	NC	ND	ND	NC
Endrin	30	50	NA	NA	NC	ND	ND	NC
Heptachlor	30	50	NA	NA	NC	ND	ND	NC
a-Chlordane	30	50	NA	NA	NC	ND	ND	NC
g-Chlordane	30	50	NA	NA	NC	ND	ND	NC
Dioxin Furan (µg/g)								
TCDFs (total)	30	50	190	ND	NC	NA	NA	NC
2,3,7,8-TCDF	30	50	2.9	ND	NC	NA	NA	NC
PeCDFs (total)	30	50	310	ND	NC	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	5.3	ND	NC	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	14	ND	NC	NA	NA	NC
HxCDFs (total)	30	50	140	ND	NC	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	25	ND	NC	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	12	ND	NC	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	15	ND	NC	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	ND	ND	NC	NA	NA	NC
HpCDFs (total)	30	50	55	ND	NC	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	38	ND	NC	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	ND	ND	NC	NA	NA	NC
OCDF	30	50	19	ND	NC	NA	NA	NC
TCDD (total)	30	50	6.9	ND	NC	NA	NA	NC
2,3,7,8-TCDD	30	50	ND	ND	NC	NA	NA	NC
PeCDDs (total)	30	50	ND	ND	NC	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	ND	ND	NC	NA	NA	NC
HxCDDs (total)	30	50	31	ND	NC	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	ND	ND	NC	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	ND	ND	NC	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	ND	ND	NC	NA	NA	NC
HpCDDs (total)	30	50	56	ND	NC	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	30	ND	NC	NA	NA	NC
OCDD	30	50	110	ND	NC	NA	NA	NC
Total Petroleum Hydrocarbons (µg/g)	30	50	NA	NA	NC	ND	ND	NC
Explosives (µg/g)	30	50	ND	ND	NC	NA	NA	NC
Metals (µg/g)								
Aluminum	20	30	3830	6400	50	760	5480	151
Barium	20	30	1200	222	138	21.5	87.8	121
Beryllium	20	30	ND	0.439	NC	ND	0.761	NC
Calcium	20	30	2890	2030	35	77800	11800	147
Cadmium	20	30	1.62	ND	NC	ND	3.01	NC
Cobalt	20	30	2.04	3.56	54	ND	3.53	NC
Copper	20	30	4190	70.3	193	5	62.2	169
Iron	20	30	4820	5140	6	2110	7420	111
Potassium	20	30	606	1260	70	282	2060	152
Magnesium	20	30	8320	3670	78	6160	3710	50
Manganese	20	30	244	294	19	73.1	305	123
Sodium	20	30	114	385	109	353	544	43
Nickel	20	30	14.3	8.81	48	3.97	9.15	79
Antimony	20	30	593	ND	NC	ND	ND	NC
Thallium	20	30	ND	8.19	NC	ND	ND	NC
Zinc	20	30	440	50.6	159	15	228	175
Silver	20	30	4.08	ND	NC	ND	0.684	NC
Chromium	20	30	97.8	8.78	167	7.49	8.66	14
Lead	20	30	43200	252	198	ND	337	NC
Selenium	20	30	ND	ND	NC	1.09	0.217	134
Vanadium	20	30	6.29	11	54	3.51	10.4	99
Arsenic	20	30	27.8	3.06	160	2.4	15.9	147
Mercury	20	30	0.038	ND	NC	ND	ND	NC
Moisture	20	30	6.6	9.2	33	3.9	13.3	109

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected

SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls
* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5d
FIELD DUPLICATE SAMPLE SUMMARY FOR ADDENDUM SOIL SAMPLES

Sample ID Laboratory ID Date Sampled Depth (feet)	RPD Control Limit (%) High*	RPD Control Limit (%) Low*	SB-45-013A TNSOIL2*342 6/1/94 7.0	SB-45-013A TNSOIL2*363 6/1/94 7.0	Relative Percent Difference (%)	SB-48-001A TNSOIL2*365 5/27/94 4.0	SB-48-001A TNSOIL2*362 5/27/94 4.0	Relative Percent Difference (%
VOCs (µg/g)								
Trichlorofluoromethane			ND	ND	NC	ND	ND	NC
SVOCs (µg/g)								
Anthracene	30	50	ND	ND	NC	ND	ND	NC
Benzo(b)fluoranthene	30	50	ND	ND	NC	ND	ND	NC
Benzo(k)fluoranthene	30	50	ND	ND	NC	ND	ND	NC
Chrysene	30	50	ND	ND	NC	ND	ND	NC
Di-n-butyl phthalate	30	50	ND	ND	NC	ND	ND	NC
Fluoranthene	30	50	ND	ND	NC	ND	ND	NC
Phenanthrene	30	50	ND	ND	NC	ND	ND	NC
Pyrene	30	50	ND	ND	NC	ND	ND	NC
OC Pesticides/PCBs (µg/g)								
Lindane	30	50	ND	ND	NC	ND	ND	NC
ppDDD	30	50	ND	ND	NC	ND	ND	NC
ppDDE	30	50	ND	ND	NC	ND	ND	NC
ppDDT	30	50	ND	ND	NC	ND	ND	NC
Dieldrin	30	50	ND	ND	NC	ND	ND	NC
Endrin	30	50	ND	ND	NC	ND	ND	NC
Heptachlor	30	50	ND	ND	NC	ND	ND	NC
a-Chlordane	30	50	ND	ND	NC	ND	ND	NC
g-Chlordane	30	50	ND	ND	NC	ND	ND	NC
Dioxin Furan (µg/g)								
TCDFs (total)	30	50	NA	NA	NC	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC	NA	NA	NC
OCDF	30	50	NA	NA	NC	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC	NA	NA	NC
1,2,3,7,8-PeCDD	30	50	NA	NA	NC	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC	NA	NA	NC
OCDD	30	50	NA	NA	NC	NA	NA	NC
Total Petroleum Hydrocarbons (µg/g)	30	50	ND	ND	NC	ND	ND	NC
Explosives (µg/g)	30	50	NA	NA	NC	NA	NA	NC
Metals (µg/g)								
Aluminum	20	30	760	5480	151	760	5480	151
Barium	20	30	21.5	87.8	121	21.5	87.8	121
Beryllium	20	30	ND	0.761	NC	ND	0.761	NC
Calcium	20	30	77800	11800	147	77800	11800	147
Cadmium	20	30	ND	3.01	NC	ND	3.01	NC
Cobalt	20	30	ND	3.53	NC	ND	3.53	NC
Copper	20	30	5	62.2	169	5	62.2	169
Iron	20	30	2110	7420	111	2110	7420	111
Potassium	20	30	282	2060	152	282	2060	152
Magnesium	20	30	6160	3710	50	6160	3710	50
Manganese	20	30	73.1	305	123	73.1	305	123
Sodium	20	30	353	544	43	353	544	43
Nickel	20	30	3.97	9.15	79	3.97	9.15	79
Antimony	20	30	ND	ND	NC	ND	ND	NC
Thallium	20	30	ND	ND	NC	ND	ND	NC
Zinc	20	30	15	228	175	15	228	175
Silver	20	30	ND	0.684	NC	ND	0.684	NC
Chromium	20	30	7.49	8.66	14	7.49	8.66	14
Lead	20	30	ND	337	NC	ND	337	NC
Selenium	20	30	1.09	0.217	134	1.09	0.217	134
Vanadium	20	30	3.51	10.4	99	3.51	10.4	99
Arsenic	20	30	2.4	15.9	147	2.4	15.9	147
Mercury	20	30	ND	ND	NC	ND	ND	NC
Moisture	20	30	7.0	9.4	29	13.2	14.0	6

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected

SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls
* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-5d
FIELD DUPLICATE SAMPLE SUMMARY FOR ADDENDUM SOIL SAMPLES
(Page 3 of 3)

Sample ID / Laboratory ID / Date Sampled / Depth (feet)	RPD Control Limit (%) High*	RPD Control Limit (%) Low*	SB-45-008A TNSOIL2*332 5/25/94 7.0	SB-45-008A TNSOIL2*361 5/25/94 7.0	Relative Percent Difference (%)	SB-45-012A TNSOIL2*369 6/9/94 8.0	SB-45-012A TNSOIL2*375 6/9/94 8.0	Relative Percent Difference (%)
VOCs (µg/g)								
Trichlorofluoromethane			ND	ND	NC	ND	0.0055	NC
SVOCs (µg/g)								
Anthracene	30	50	ND	ND	NC	NA	NA	NC
Benzo(b)fluoranthene	30	50	ND	ND	NC	NA	NA	NC
Benzo(k)fluoranthene	30	50	ND	ND	NC	NA	NA	NC
Chrysene	30	50	ND	ND	NC	NA	NA	NC
Di-n-butyl phthalate	30	50	ND	ND	NC	NA	NA	NC
Fluoranthene	30	50	ND	ND	NC	NA	NA	NC
Phenanthrene	30	50	ND	ND	NC	NA	NA	NC
Pyrene	30	50	ND	ND	NC	NA	NA	NC
OC Pesticides/PCBs (µg/g)								
Lindane	30	50	ND	ND	NC	NA	NA	NC
ppDDD	30	50	ND	ND	NC	NA	NA	NC
ppDDE	30	50	ND	ND	NC	NA	NA	NC
ppDDT	30	50	ND	ND	NC	NA	NA	NC
Dieldrin	30	50	ND	ND	NC	NA	NA	NC
Endrin	30	50	ND	ND	NC	NA	NA	NC
Heptachlor	30	50	ND	ND	NC	NA	NA	NC
a-Chlordane	30	50	ND	ND	NC	NA	NA	NC
g-Chlordane	30	50	ND	ND	NC	NA	NA	NC
Dioxin Furan (µg/g)								
TCDFs (total)	30	50	NA	NA	NC	NA	NA	NC
2,3,7,8-TCDF	30	50	NA	NA	NC	NA	NA	NC
PeCDFs (total)	30	50	NA	NA	NC	NA	NA	NC
1,2,3,7,8,-PeCDF	30	50	NA	NA	NC	NA	NA	NC
2,3,4,7,8-PeCDF	30	50	NA	NA	NC	NA	NA	NC
HxCDFs (total)	30	50	NA	NA	NC	NA	NA	NC
1,2,3,4,7,8-HxCDF	30	50	NA	NA	NC	NA	NA	NC
1,2,3,6,7,8-HxCDF	30	50	NA	NA	NC	NA	NA	NC
2,3,4,6,7,8-HxCDF	30	50	NA	NA	NC	NA	NA	NC
1,2,3,7,8,9-HxCDF	30	50	NA	NA	NC	NA	NA	NC
HpCDFs (total)	30	50	NA	NA	NC	NA	NA	NC
1,2,3,4,6,7,8-HpCDF	30	50	NA	NA	NC	NA	NA	NC
1,2,3,4,7,8,9-HpCDF	30	50	NA	NA	NC	NA	NA	NC
OCDF	30	50	NA	NA	NC	NA	NA	NC
TCDD (total)	30	50	NA	NA	NC	NA	NA	NC
2,3,7,8-TCDD	30	50	NA	NA	NC	NA	NA	NC
PeCDDs (total)	30	50	NA	NA	NC	NA	NA	NC
1.2.3,7,8-PeCDD	30	50	NA	NA	NC	NA	NA	NC
HxCDDs (total)	30	50	NA	NA	NC	NA	NA	NC
1,2,3,4,7,8-HxCDD	30	50	NA	NA	NC	NA	NA	NC
1,2,3,6,7,8_HxCDD	30	50	NA	NA	NC	NA	NA	NC
1,2,3,7,8,9-HxCDD	30	50	NA	NA	NC	NA	NA	NC
HpCDDs (total)	30	50	NA	NA	NC	NA	NA	NC
1,2,3,4,6,7,8-HpCDD	30	50	NA	NA	NC	NA	NA	NC
OCDD	30	50	NA	NA	NC	NA	NA	NC
Total Petroleum Hydrocarbons (µg/g)	30	50	ND	ND	NC	NA	NA	NC
Explosives (µg/g)	30	50	NA	NA	NC	NA	NA	NC
Metals (µg/g)								
Aluminum	20	30	981	726	30	NA	NA	NC
Barium	20	30	26.2	22.2	17	NA	NA	NC
Beryllium	20	30	ND	ND	NC	NA	NA	NC
Calcium	20	30	72300	62900	14	NA	NA	NC
Cadmium	20	30	ND	ND	NC	NA	NA	NC
Cobalt	20	30	0.857	ND	NC	NA	NA	NC
Copper	20	30	2	2.32	5	NA	NA	NC
Iron	20	30	1910	1940	2	NA	NA	NC
Potassium	20	30	291	222	27	NA	NA	NC
Magnesium	20	30	4890	5020	3	NA	NA	NC
Manganese	20	30	52.6	51.2	3	NA	NA	NC
Sodium	20	30	422	361	16	NA	NA	NC
Nickel	20	30	4.06	4.06	<1	NA	NA	NC
Antimony	20	30	ND	ND	NC	NA	NA	NC
Thallium	20	30	ND	ND	NC	NA	NA	NC
Zinc	20	30	8.66	8.78	1	NA	NA	NC
Silver	20	30	ND	ND	NC	NA	NA	NC
Chromium	20	30	6.21	5.8	7	NA	NA	NC
Lead	20	30	ND	ND	NC	NA	NA	NC
Selenium	20	30	0.682	1.120	49	NA	NA	NC
Vanadium	20	30	3.37	3.51	4	NA	NA	NC
Arsenic	20	30	2.5	2.19	12	NA	NA	NC
Mercury	20	30	ND	ND	NC	NA	NA	NC
Moisture	20	30	3.8	4.3	12	3.4	3.1	9

RPD - Relative Percent Difference
NA - Not Analyzed
NC - Not Calculated
ND - Not Detected

SVOCs - Semivolatile Organic Compounds
OC Pesticides/PCBs - Organochlorine Pesticides and Polychlorinated Biphenyls
* Low level refers to concentrations less than ten times the certified reporting limit.
High level refers to concentrations greater than ten times the certified reporting limit.

ATTACHMENT E-6

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

ATTACHMENT E-6a

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
(Page 1 of 22)

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
Volatile Organic Compounds by GC/MS								
SB-42-048A	0	10/22/93	Benzene	66-142	112	114	21	2
			Chlorobenzene	76-150	111	111	21	<1
			1,1-Dichloroethylene	59-172	98	98	22	<1
			Toluene	59-139	116	118	21	2
			Trichloroethene	62-137	107	109	24	2
SB-45-006A	10	5/25/94	Benzene	66-142	101	101	21	<1
Addendum Sample			Chlorobenzene	76-150	102	104	21	2
			1,1-Dichloroethylene	59-172	102	102	22	<1
			Toluene	59-139	104	101	21	3
			Trichloroethene	62-137	104	102	24	2
SB-48-001A	4	5/27/94	Benzene	66-142	87	87	21	<1
Addendum Sample			Chlorobenzene	76-150	90	89	21	1
			1,1-Dichloroethylene	59-172	108	101	22	7
			Toluene	59-139	99	99	21	<1
			Trichloroethene	62-137	86	85	24	1
SB-42-050A	0.5	5/31/94	Benzene	66-142	90	90	21	<1
Addendum Sample			Chlorobenzene	76-150	92	92	21	<1
			1,1-Dichloroethylene	59-172	206	206	22	<1
			Toluene	59-139	90	88	21	2
			Trichloroethene	62-137	92	92	24	<1
SB-48-001ADUP	4	5/27/94	Benzene	66-142	103	93	21	10
Addendum Sample			Chlorobenzene	76-150	105	93	21	12
			1,1-Dichloroethylene	59-172	112	102	22	9
			Toluene	59-139	105	93	21	12
			Trichloroethene	62-137	105	93	24	12

ATTACHMENT E-6a

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-48-001B	9.5	6/9/94	Benzene	66-142	70	74	21	6
	Addendum Sample		Chlorobenzene	76-150	78	84	21	7
			1,1-Dichloroethylene	59-172	74	82	22	10
			Toluene	59-139	72	78	21	8
			Trichloroethene	62-137	72	78	24	8
SB-45-014A	8.5	6/9/94	Benzene	66-142	66	72	21	9
	Addendum Sample		Chlorobenzene	76-150	75	79	21	5
			1,1-Dichloroethylene	59-172	74	97	22	27
			Toluene	59-139	70	74	21	6
			Trichloroethene	62-137	72	74	24	3
Benzene, Toluene, Ethylbenzene and Xylene by GC								
B-34-001ADUP	0	10/26/93	Benzene	74-130	82	82	28	<1
			Toluene	75-127	87	86	26	<1
Semivolatile Organic Compounds								
SB-37-007B	1.5	11/9/93	4-Chloro-3-methylphenol	26-130	83	116	33	**34**
			1,4-Dichlorobenzene	28-104	81	84	27	4
			2,4-Dinitrotoluene	28-89	**102**	**102**	47	<1
			4-Nitrophenol	11-114	55	**125**	50	**77**
			N-nitroso-di-n-propylamine	41-126	58	99	38	**52**
			Pentachlorophenol	17-109	83	84	47	2
			Phenol	26-90	68	78	35	14
			Pyrene	35-142	81	73	36	11
			1,2,4-Trichlorobenzene	38-107	87	76	23	14
			2-Chlorophenol	25-102	81	80	50	2
			Acenaphthene	31-137	84	93	19	10
SB-42-049B	5	10/22/93	4-Chloro-3-methylphenol	26-130	82	76	33	9
			1,4-Dichlorobenzene	28-104	85	77	27	10
			2,4-Dinitrotoluene	28-89	**94**	88	47	6
			4-Nitrophenol	11-114	59	54	50	10
			N-nitroso-di-n-propylamine	41-126	55	47	38	16
SB-42-049B (con't)	5	10/22/93	Pentachlorophenol	17-109	85	78	47	8

ATTACHMENT E-6a

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
(Page 3 of 22)

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
			Phenol	26-90	70	60	35	15
			Pyrene	35-142	94	83	36	13
			1,2,4-Trichlorobenzene	38-107	94	85	23	9
			2-Chlorophenol	25-102	84	76	50	10
			Acenaphthene	31-137	88	77	19	13
SB-45-005A	12	5/24/94	4-Chloro-3-methylphenol	26-130	82	85	33	4
	Addendum Sample		1,4-Dichlorobenzene	28-104	79	82	27	4
			2,4-Dinitrotoluene	28-89	88	88	47	<1
			4-Nitrophenol	11-114	75	79	50	5
			N-nitroso-di-n-propylamine	41-126	73	79	38	8
			Pentachlorophenol	17-109	86	85	47	1
			Phenol	26-90	84	82	35	2
			Pyrene	35-142	90	87	36	3
			1,2,4-Trichlorobenzene	38-107	82	82	23	<1
			2-Chlorophenol	25-102	85	84	50	1
			Acenaphthene	31-137	85	91	19	7
SB-45-006A	10	5/25/94	4-Chloro-3-methylphenol	26-130	91	96	33	5
	Addendum Sample		1,4-Dichlorobenzene	28-104	93	99	27	6
			2,4-Dinitrotoluene	28-89	90	87	47	3
			4-Nitrophenol	11-114	101	96	50	5
			N-nitroso-di-n-propylamine	41-126	75	75	38	<1
			Pentachlorophenol	17-109	114	109	47	4
			Phenol	26-90	91	94	35	3
			Pyrene	35-142	110	104	36	6
			1,2,4-Trichlorobenzene	38-107	96	99	23	3
			2-Chlorophenol	25-102	93	97	50	4
			Acenaphthene	31-137	102	96	19	6
SB-48-001ADUP	4	5/27/94	4-Chloro-3-methylphenol	26-130	85	90	33	6
	Addendum Sample		1,4-Dichlorobenzene	28-104	101	106	27	5
			2,4-Dinitrotoluene	28-89	62	62	47	<1
SB-48-001ADUP	4	5/27/94	4-Nitrophenol	11-114	71	65	50	9

ATTACHMENT E-6a

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
(Page 4 of 22)

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
(con't)			N-nitroso-di-n-propylamine	41-126	78	78	38	<1
			Pentachlorophenol	17-109	88	66	47	29
			Phenol	26-90	101	111	35	9
			Pyrene	35-142	80	75	36	6
			1,2,4-Trichlorobenzene	38-107	96	106	23	10
			2-Chlorophenol	25-102	94	95	50	1
			Acenaphthene	31-137	96	98	19	2
SB-42-050A	0.5	5/31/94	4-Chloro-3-methylphenol	26-130	106	113	33	6
	Addendum Sample		1,4-Dichlorobenzene	28-104	104	95	27	9
			2,4-Dinitrotoluene	28-89	269	280	47	4
			4-Nitrophenol	11-114	136	140	50	3
			N-nitroso-di-n-propylamine	41-126	91	84	38	8
			Pentachlorophenol	17-109	91	92	47	1
			Phenol	26-90	109	104	35	5
			Pyrene	35-142	91	80	36	13
			1,2,4-Trichlorobenzene	38-107	87	90	23	3
			2-Chlorophenol	25-102	108	101	50	7
			Acenaphthene	31-137	95	93	19	2
SB-48-001B	9.5	6/9/94	4-Chloro-3-methylphenol	26-130	82	86	33	5
	Addendum Sample		1,4-Dichlorobenzene	28-104	111	114	27	3
			2,4-Dinitrotoluene	28-89	88	88	47	<1
			4-Nitrophenol	11-114	80	73	50	9
			N-nitroso-di-n-propylamine	41-126	102	99	38	3
			Pentachlorophenol	17-109	61	63	47	3
			Phenol	26-90	88	88	35	<1
			Pyrene	35-142	97	94	36	3
			1,2,4-Trichlorobenzene	38-107	108	105	23	3
			2-Chlorophenol	25-102	86	85	50	1
			Acenaphthene	31-137	70	67	19	4

ATTACHMENT E-6a

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
(Page 5 of 22)

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
Organochlorine Pesticides								
SB-34-006B	1.5	10/24/93	g-BHC (Lindane)	45-129	73	73	42	<1
			Aldrin	53-133	86	86	40	<1
			DDT, pp	37-155	77	82	59	6
			Dieldrin	46-140	86	86	47	<1
			Endosulfan, A	45-153	86	86	50	<1
			Endosulfan, B	60-120	86	91	50	5
			Endrin	52-126	95	105	37	9
			Heptachlor	30-148	82	82	59	<1
			Isodrin	97-117	**80**	**80**	10	<1
			Methoxychlor	61-167	112	123	53	9
SB-34-010A	0	10/25/93	g-BHC (Lindane)	45-129	66	61	42	7
			Aldrin	53-133	84	75	40	12
			DDT, pp	37-155	84	94	59	11
			Dieldrin	46-140	78	73	47	6
			Endosulfan, A	45-153	75	75	50	<1
			Endosulfan, B	60-120	75	66	50	13
			Endrin	52-126	122	108	37	12
			Heptachlor	30-148	84	80	59	6
			Isodrin	97-117	**73**	**70**	10	4
			Methoxychlor	61-167	88	76	53	14
SB-34-001E	20	10/26/93	g-BHC (Lindane)	45-129	62	62	42	<1
			Aldrin	53-133	80	80	40	<1
			DDT, pp	37-155	75	80	59	6
			Dieldrin	46-140	80	80	47	<1
			Endosulfan, A	45-153	81	81	50	<1
			Endosulfan, B	60-120	86	81	50	6
			Endrin	52-126	80	80	37	<1
			Heptachlor	30-148	81	76	59	6
			Isodrin	97-117	**73**	**73**	10	<1
			Methoxychlor	61-167	88	86	53	2

ATTACHMENT E-6a

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
(Page 6 of 22)

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-45-006A	10	5/25/94	g-BHC (Lindane)	45-129	87	92	42	6
	Addendum Sample		Aldrin	53-133	92	92	40	<1
			DDT, pp	37-155	92	92	59	<1
			Dieldrin	46-140	87	87	47	<1
			Endosulfan, A	45-153	87	92	50	6
			Endosulfan, B	60-120	87	87	50	<1
			Endrin	52-126	87	92	37	6
			Heptachlor	30-148	92	92	59	<1
			Isodrin	97-117	83	86	10	4
			Methoxychlor	61-167	106	106	53	<1
SB-45-004B	9	5/26/94	g-BHC (Lindane)	45-129	79	83	42	5
	Addendum Sample		Aldrin	53-133	79	79	40	<1
			DDT, pp	37-155	71	76	59	7
			Dieldrin	46-140	64	73	47	13
			Endosulfan, A	45-153	69	78	50	12
			Endosulfan, B	60-120	40	68	50	52
			Endrin	52-126	58	77	37	28
			Heptachlor	30-148	83	83	59	<1
			Isodrin	97-117	71	71	10	<1
			Methoxychlor	61-167	30	75	53	86
SB-48-002A	3.5	5/27/94	g-BHC (Lindane)	45-129	101	106	42	5
	Addendum Sample		Aldrin	53-133	124	110	40	12
			DDT, pp	37-155	106	119	59	12
			Dieldrin	46-140	101	106	47	5
			Endosulfan, A	45-153	101	110	50	9
			Endosulfan, B	60-120	96	110	50	14
			Endrin	52-126	106	115	37	8
			Heptachlor	30-148	96	106	59	10
			Isodrin	97-117	98	104	10	6
			Methoxychlor	61-167	110	122	53	10

ATTACHMENT E-6a

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
(Page 7 of 22)

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-45-012B	10.5	6/1/94	g-BHC (Lindane)	45-129	102	102	42	<1
	Addendum Sample		Aldrin	53-133	102	102	40	<1
			DDT, pp	37-155	112	107	59	5
			Dieldrin	46-140	107	102	47	5
			Endosulfan, A	45-153	107	102	50	5
			Endosulfan, B	60-120	102	102	50	<1
			Endrin	52-126	112	102	37	9
			Heptachlor	30-148	107	102	59	5
			Isodrin	97-117	103	97	10	6
			Methoxychlor	61-167	113	109	53	4
SB-48-001B	9.5	6/9/94	g-BHC (Lindane)	45-129	102	116	42	13
	Addendum Sample		Aldrin	53-133	102	117	40	14
			DDT, pp	37-155	107	121	59	12
			Dieldrin	46-140	102	116	47	13
			Endosulfan, A	45-153	102	116	50	13
			Endosulfan, B	60-120	102	117	50	14
			Endrin	52-126	107	121	37	12
			Heptachlor	30-148	102	121	59	17
			Isodrin	97-117	92	108	10	16
			Methoxychlor	61-167	107	124	53	15

ATTACHMENT E-6a

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
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Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
Explosives								
SD-21-001	0	10/7/93	2,4-DNT	68-106	90	86	19	4
			RDX	71-107	94	93	18	<1
			1,3,5-TNB	65-115	88	88	25	<1
			Nitrobenzene	72-120	101	98	24	2
			2,4,6-TNT	72-118	77	78	23	2
SB-42-032B	5	10/20/93	2,4-DNT	68-106	88	90	19	2
			RDX	71-107	99	100	18	1
			1,3,5-TNB	65-115	86	85	25	<1
			Nitrobenzene	72-120	102	104	24	2
			2,4,6-TNT	72-118	85	83	23	2
SB-42-017D	67	11/8/93	2,4-DNT	68-106	89	89	19	<1
			RDX	71-107	87	88	18	1
			1,3,5-TNB	65-115	89	72	25	21
			Nitrobenzene	72-120	106	105	24	<1
			2,4,6-TNT	72-118	91	88	23	2
SB-42-044B	5	10/22/93	2,4-DNT	68-106	96	92	19	4
			RDX	71-107	105	102	18	3
			1,3,5-TNB	65-115	95	94	25	1
			Nitrobenzene	72-120	111	110	24	1
			2,4,6-TNT	72-118	94	90	23	4
SB-42-018A	0	10/13/93	2,4-DNT	68-106	84	88	19	5
			RDX	71-107	88	91	18	3
			1,3,5-TNB	65-115	77	85	25	10
			Nitrobenzene	72-120	100	103	24	2
			2,4,6-TNT	72-118	83	88	23	6
SB-20-002B	1.5	11/2/93	2,4-DNT	68-106	95	93	19	3
			RDX	71-107	98	95	18	3
			1,3,5-TNB	65-115	98	95	25	3
			Nitrobenzene	72-120	110	106	24	3
			2,4,6-TNT	72-118	98	96	23	3

ATTACHMENT E-6a

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-20-011A	0	11/3/93	2,4-DNT	68-106	92	93	19	<1
			RDX	71-107	99	101	18	2
			1,3,5-TNB	65-115	86	82	25	5
			Nitrobenzene	72-120	108	108	24	<1
			2,4,6-TNT	72-118	93	90	23	3
SB-20-019B	1.5	11/2/93	2,4-DNT	68-106	90	88	19	3
			RDX	71-107	94	93	18	1
			1,3,5-TNB	65-115	89	74	25	18
			Nitrobenzene	72-120	105	103	24	2
			2,4,6-TNT	72-118	92	88	23	5
SB-42-015D	77	11/5/93	2,4-DNT	68-106	69	71	19	2
			RDX	71-107	77	77	18	<1
			1,3,5-TNB	65-115	65	75	25	15
			Nitrobenzene	72-120	80	82	24	2
			2,4,6-TNT	72-118	**71**	73	23	3
EP-42-001B	7	5/18/94	2,4-DNT	68-106	95	97	19	2
Addendum sample			RDX	71-107	90	87	18	3
			1,3,5-TNB	65-115	75	81	25	8
			Nitrobenzene	72-120	94	103	24	9
			2,4,6-TNT	72-118	104	106	23	2
SB-42-050A	0.5	5/31/94	2,4-DNT	68-106	91	92	19	1
Addendum sample			RDX	71-107	81	81	18	<1
			1,3,5-TNB	65-115	89	89	25	<1
			Nitrobenzene	72-120	80	81	24	1
			2,4,6-TNT	72-118	107	107	23	<1

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MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
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Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
TOTAL PETROLEUM HYDROCARBONS AS GAS AND DIESEL								
SB-45-006A	10	5/25/94	Gas	43-130	63	65	30	3
Addendum Sample			Diesel	41-151	98	97	30	1
SB-45-004A	6.5	5/26/94	Gas	43-130	78	85	30	9
Addendum Sample			Diesel	41-151	93	94	30	1
SB-48-001ADUP	4	5/27/94	Gas	43-130	94	87	30	8
Addendum Sample			Diesel	41-151	92	97	30	5
SB-48-001B	9.5	6/9/94	Gas	43-130	84	95	30	12
Addendum Sample			Diesel	41-151	94	99	30	5
Metals								
GFAA Metals								
SB-BK-012B	3	10/6/93	Arsenic	72-120	**61**	81	24	**28**
			Selenium	71-129	**34**	**35**	29	5
SB-42-022B	3	10/13/93	Arsenic	72-120	86	101	24	16
			Selenium	71-129	**50**	**59**	29	17
SB-34-003C	11	10/27/93	Arsenic	72-120	85	91	24	7
			Selenium	71-129	**68**	72	29	5
SB-34-009A	0	10/25/93	Arsenic	72-120	82	86	24	5
			Selenium	71-129	77	82	29	7
SB-20-002A	0	11/2/93	Arsenic	72-120	84	103	24	20
			Selenium	71-129	**25**	**28**	29	11
SB-20-018A	0	11/3/93	Arsenic	72-120	**65**	**55**	24	16
			Selenium	71-129	**26**	**27**	29	4
SB-20-001A	0	11/4/93	Arsenic	72-120	**184**	**171**	24	7
			Selenium	71-129	**40**	**40**	29	<1
SB-20-001B	1.5	11/4/93	Arsenic	72-120	101	**156**	24	43
			Selenium	71-129	**46**	**57**	29	21
SB-20-016A	0	11/4/93	Arsenic	72-120	**129**	110	24	15
			Selenium	71-129	**43**	**33**	29	27

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MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
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Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-20-016B	1.5	11/4/93	Arsenic	72-120	**128**	112	24	14
			Selenium	71-129	**44**	**39**	29	11
SB-42-017E	92	11/8/93	Arsenic	72-120	107	**44**	24	**84**
			Selenium	71-129	**21**	**19**	29	12
SB-42-028A	0	10/19/93	Arsenic	72-120	**181**	**220**	24	19
			Selenium	71-129	**54**	**52**	29	3
SB-42-028B	3	10/19/93	Arsenic	72-120	105	112	24	7
			Selenium	71-129	**41**	**44**	29	8
B-42-033ADUP	0	10/20/93	Arsenic	72-120	**68**	78	24	13
			Selenium	71-129	**41**	**42**	29	<1
B-42-037ADUP	0	10/21/93	Arsenic	72-120	97	87	24	11
			Selenium	71-129	**38**	**40**	29	6
SB-42-044B	5	10/22/93	Arsenic	72-120	73	88	24	18
			Selenium	71-129	**27**	**28**	29	4
SB-BK-013A	0	10/23/93	Arsenic	72-120	107	98	24	9
			Selenium	71-129	**26**	**24**	29	8
SB-45-006A	10	5/25/94	Arsenic	72-120	77	74	29	4
Addendum Sample			Selenium	71-129	69	65	24	6
SB-48-002B	10	5/27/94	Arsenic	72-120	86	68	29	23
Addendum Sample			Selenium	71-129	68	65	24	5
SB-42-050A	0.5	5/31/94	Arsenic	72-120	207	329	29	46
Addendum Sample			Selenium	71-129	-2	1	24	<1
SB-48-001B	9.5	6/9/94	Arsenic	72-120	85	92	29	8
Addendum Sample			Selenium	71-129	66	65	24	2
CVAA Metals								
SD-21-001	0	10/7/93	Mercury	83-125	**76**	**64**	21	17
SB-BK-011A	0	10/6/93	Mercury	83-125	**77**	84	21	9
SB-42-028A	0	10/19/93	Mercury	83-125	118	89	21	**28**
SB-42-028B	3	10/19/93	Mercury	83-125	89	88	21	<1
SB-42-032B	5	10/20/93	Mercury	83-125	102	106	21	4
B-42-033ADUP	0	10/20/93	Mercury	83-125	99	101	21	2
SB-34-001A	0	10/26/93	Mercury	83-125	122	122	21	<1
SB-34-001B	6	10/26/93	Mercury	83-125	121	123	21	2

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MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
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Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-34-003C	11	10/27/93	Mercury	83-125	107	106	21	<1
SB-34-006C	3	10/24/93	Mercury	83-125	101	101	21	<1
SB-20-002A	0	11/2/93	Mercury	83-125	105	108	21	3
SB-20-002B	1.5	11/2/93	Mercury	83-125	108	108	21	<1
SB-20-008A	0	11/4/93	Mercury	83-125	89	95	21	7
SB-20-009B	1.5	11/4/93	Mercury	83-125	104	97	21	7
SB-20-016A	0	11/4/93	Mercury	83-125	112	98	21	13
SB-42-015D	77	11/5/93	Mercury	83-125	105	104	21	1
SB-42-016C	42	11/5/93	Mercury	83-125	105	103	21	2
SB-45-006A	10	5/25/94	Mercury-Addendum Sample	83-125	104	111	21	7
SB-48-002B	10	5/27/94	Mercury-Addendum Sample	83-125	125	121	21	3
SB-42-050A	0.5	5/31/94	Mercury-Addendum Sample	83-125	64	73	21	13
SB-48-001B	9.5	6/9/94	Mercury-Addendum Sample	83-125	94	97	21	3
ICP Metals								
SB-42-018ADUP	0	10/13/93	Antimony	79-109	94	92	15	2
			Barium	86-106	**106**	95	10	11
			Beryllium	78-108	96	95	15	2
			Cadmium	80-108	93	95	14	3
			Chromium	79-109	93	90	15	3
			Cobalt	85-105	94	91	10	3
			Copper	84-108	95	96	12	1
			Lead	79-109	88	92	15	5
			Nickel	78-106	90	89	14	2
			Silver	73-107	92	91	17	2
			Thallium	75-111	94	94	18	<1
			Vanadium	87-105	91	88	9	3
			Zinc	76-112	93	93	18	<1

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MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-42-021BDUP	4	10/13/93	Antimony	79-109	93	91	15	2
			Barium	86-106	97	**109**	10	12
			Beryllium	78-108	92	91	15	1
			Cadmium	80-108	92	90	14	2
			Chromium	79-109	88	87	15	<1
			Cobalt	85-105	88	86	10	2
			Copper	84-108	94	93	12	1
			Lead	79-109	90	88	15	3
			Nickel	78-106	87	86	14	<1
			Silver	73-107	86	85	17	<1
			Thallium	75-111	91	89	18	2
			Vanadium	87-105	91	90	9	<1
			Zinc	76-112	92	91	18	1
SB-42-028A	0	10/19/93	Antimony	79-109	**76**	**77**	15	<1
			Barium	86-106	94	103	10	9
			Beryllium	78-108	94	96	15	2
			Cadmium	80-108	90	91	14	1
			Chromium	79-109	87	89	15	2
			Cobalt	85-105	87	89	10	2
			Copper	84-108	91	91	12	<1
			Lead	79-109	94	96	15	2
			Nickel	78-106	86	87	14	1
			Silver	73-107	88	91	17	3
			Thallium	75-111	91	93	18	2
			Vanadium	87-105	89	91	9	1
			Zinc	76-112	91	90	18	2

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MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
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Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-42-028B	3	10/19/93	Antimony	79-109	86	86	15	<1
			Barium	86-106	86	85	10	<1
			Beryllium	78-108	93	94	15	1
			Cadmium	80-108	87	88	14	1
			Chromium	79-109	84	86	15	2
			Cobalt	85-105	83	**85**	10	2
			Copper	84-108	88	89	12	2
			Lead	79-109	90	92	15	2
			Nickel	78-106	81	82	14	1
			Silver	73-107	89	91	17	2
			Thallium	75-111	82	84	18	2
			Vanadium	87-105	**86**	87	9	1
			Zinc	76-112	84	84	18	<1
SB-42-042B	5	10/22/93	Antimony	79-109	**77**	**77**	15	<1
			Barium	86-106	102	94	10	8
			Beryllium	78-108	97	99	15	2
			Cadmium	80-108	89	90	14	1
			Chromium	79-109	88	**120**	15	**31**
			Cobalt	85-105	87	88	10	2
			Copper	84-108	95	98	12	3
			Lead	79-109	104	99	15	5
			Nickel	78-106	85	89	14	5
			Silver	73-107	90	93	17	4
			Thallium	75-111	92	97	18	5
			Vanadium	87-105	92	92	9	<1
			Zinc	76-112	92	89	18	4

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MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
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Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-42-044A	0	10/22/93	Antimony	79-109	**40**	**53**	15	**30**
			Barium	86-106	**117**	**113**	10	4
			Beryllium	78-108	101	101	15	<1
			Cadmium	80-108	95	95	14	<1
			Chromium	79-109	99	98	15	<1
			Cobalt	85-105	95	95	10	<1
			Copper	84-108	101	101	12	<1
			Lead	79-109	100	103	15	4
			Nickel	78-106	96	96	14	<1
			Silver	73-107	98	99	17	1
			Thallium	75-111	91	92	18	1
			Vanadium	87-105	100	103	9	3
			Zinc	76-112	100	102	18	2
SB-42-034B	5	10/20/93	Antimony	79-109	84	80	15	6
			Barium	86-106	103	**74**	10	**33**
			Beryllium	78-108	95	87	15	8
			Cadmium	80-108	89	83	14	7
			Chromium	79-109	120	79	15	**41**
			Cobalt	85-105	89	83	10	7
			Copper	84-108	96	85	12	12
			Lead	79-109	103	83	15	**22**
			Nickel	78-106	90	**77**	14	**15**
			Silver	73-107	88	83	17	6
			Thallium	75-111	93	89	18	5
			Vanadium	87-105	89	**82**	9	9
			Zinc	76-112	90	82	18	9

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MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
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Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-20-002A	0	11/2/93	Antimony	79-109	**64**	**56**	15	13
			Barium	86-106	**109**	**122**	10	11
			Beryllium	78-108	98	100	15	2
			Cadmium	80-108	95	96	14	2
			Chromium	79-109	92	94	15	2
			Cobalt	85-105	91	92	10	1
			Copper	84-108	100	100	12	<1
			Lead	79-109	94	96	15	3
			Nickel	78-106	92	93	14	2
			Silver	73-107	94	96	17	3
			Thallium	75-111	87	84	18	3
			Vanadium	87-105	94	96	9	2
			Zinc	76-112	94	104	18	11
SB-20-002B	1.5	11/2/93	Antimony	79-109	**71**	**62**	15	13
			Barium	86-106	**135**	**125**	10	8
			Beryllium	78-108	95	96	15	2
			Cadmium	80-108	90	91	14	1
			Chromium	79-109	91	87	15	5
			Cobalt	85-105	86	86	10	<1
			Copper	84-108	96	94	12	2
			Lead	79-109	95	96	15	<1
			Nickel	78-106	91	88	14	3
			Silver	73-107	89	93	17	4
			Thallium	75-111	81	88	18	9
			Vanadium	87-105	105	90	9	**15**
			Zinc	76-112	97	90	18	7

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MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
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Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-20-016A	0	11/4/93	Antimony	79-109	81	83	15	2
			Barium	86-106	82	**58**	10	**34**
			Beryllium	78-108	97	97	15	<1
			Cadmium	80-108	95	96	14	<1
			Chromium	79-109	91	94	15	3
			Cobalt	85-105	91	91	10	<1
			Copper	84-108	106	91	12	**16**
			Lead	79-109	96	79	15	**19**
			Nickel	78-106	82	**75**	14	8
			Silver	73-107	99	100	17	2
			Thallium	75-111	104	101	18	3
			Vanadium	87-105	93	93	9	<1
			Zinc	76-112	**113**	85	18	**28**
SB-42-015D	77	11/5/93	Antimony	79-109	88	89	15	<1
			Barium	86-106	88	95	10	8
			Beryllium	78-108	93	94	15	<1
			Cadmium	80-108	92	93	14	<1
			Chromium	79-109	88	89	15	1
			Cobalt	85-105	87	89	10	1
			Copper	84-108	94	95	12	<1
			Lead	79-109	92	93	15	2
			Nickel	78-106	88	89	14	<1
			Silver	73-107	94	95	17	<1
			Thallium	75-111	90	94	18	4
			Vanadium	87-105	88	87	9	1
			Zinc	76-112	91	91	18	<1

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MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
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Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SS-BK-001	0	10/23/93	Antimony	79-109	85	83	15	2
			Barium	86-106	91	95	10	5
			Beryllium	78-108	99	100	15	<1
			Cadmium	80-108	96	98	14	2
			Chromium	79-109	96	95	15	<1
			Cobalt	85-105	95	95	10	<1
			Copper	84-108	93	96	12	3
			Lead	79-109	86	92	15	7
			Nickel	78-106	94	95	14	<1
			Silver	73-107	102	105	17	2
			Thallium	75-111	104	107	18	3
			Vanadium	87-105	97	94	9	3
			Zinc	76-112	78	88	18	13
SS-BK-001DUP	0	10/23/93	Antimony	79-109	83	87	15	4
			Barium	86-106	**108**	101	10	6
			Beryllium	78-108	98	98	15	<1
			Cadmium	80-108	97	97	14	<1
			Chromium	79-109	97	96	15	<1
			Cobalt	85-105	94	94	10	<1
			Copper	84-108	101	99	12	2
			Lead	79-109	102	98	15	4
			Nickel	78-106	96	95	14	1
			Silver	73-107	102	101	17	1
			Thallium	75-111	106	105	18	<1
			Vanadium	87-105	99	98	9	1
			Zinc	76-112	104	102	18	2

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MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
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Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-42-016C	42	11/5/93	Antimony	79-109	**61**	**68**	15	11
			Barium	86-106	**85**	86	10	1
			Beryllium	78-108	93	95	15	2
			Cadmium	80-108	89	91	14	2
			Chromium	79-109	86	87	15	2
			Cobalt	85-105	85	86	10	2
			Copper	84-108	91	93	12	2
			Lead	79-109	93	94	15	1
			Nickel	78-106	87	88	14	<1
			Silver	73-107	90	91	17	<1
			Thallium	75-111	92	90	18	2
			Vanadium	87-105	**85**	87	9	2
			Zinc	76-112	86	87	18	<1
SB-20-015B	1.5	11/3/93	Antimony	79-109	**73**	**76**	15	4
			Barium	86-106	97	96	10	1
			Beryllium	78-108	96	96	15	<1
			Cadmium	80-108	97	98	14	1
			Chromium	79-109	93	93	15	<1
			Cobalt	85-105	92	92	10	<1
			Copper	84-108	95	95	12	<1
			Lead	79-109	94	95	15	<1
			Nickel	78-106	93	92	14	<1
			Silver	73-107	98	100	17	2
			Thallium	75-111	100	97	18	4
			Vanadium	87-105	94	92	9	2
			Zinc	76-112	95	91	18	4

ATTACHMENT E-6a

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
(Page 20 of 22)

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-20-015C	3	11/3/93	Antimony	79-109	81	80	15	<1
			Barium	86-106	95	96	10	1
			Beryllium	78-108	97	97	15	<1
			Cadmium	80-108	96	97	14	1
			Chromium	79-109	95	96	15	1
			Cobalt	85-105	92	92	10	<1
			Copper	84-108	97	95	12	2
			Lead	79-109	94	94	15	<1
			Nickel	78-106	96	96	14	<1
			Silver	73-107	97	98	17	1
			Thallium	75-111	102	106	18	3
			Vanadium	87-105	94	95	9	2
			Zinc	76-112	97	98	18	<1
SB-45-006A	10	5/25/94	Antimony	79-109	91	88	15	3
Addendum Sample			Barium	86-106	102	120	10	16
			Beryllium	78-108	98	101	15	3
			Cadmium	80-108	93	95	14	2
			Chromium	79-109	88	92	15	4
			Cobalt	85-105	90	92	10	2
			Copper	84-108	93	102	12	9
			Lead	79-109	94	97	15	3
			Nickel	78-106	89	102	14	14
			Silver	73-107	98	97	17	1
			Thallium	75-111	86	88	18	2
			Vanadium	87-105	94	98	9	4
			Zinc	76-112	93	99	18	6

ATTACHMENT E-6a

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY FOR SOIL SAMPLES

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-48-002B	10	5/27/94	Antimony	79-109	92	93	15	1
Addendum Sample			Barium	86-106	77	93	10	19
			Beryllium	78-108	100	102	15	2
			Cadmium	80-108	95	95	14	<1
			Chromium	79-109	119	91	15	27
			Cobalt	85-105	90	91	10	1
			Copper	84-108	96	97	12	1
			Lead	79-109	93	94	15	1
			Nickel	78-106	92	90	14	2
			Silver	73-107	97	98	17	1
			Thallium	75-111	92	88	18	4
			Vanadium	87-105	95	95	9	<1
			Zinc	76-112	91	92	18	1
SB-42-050A	0.5	5/31/94	Antimony	79-109	-79	-42	15	<1
Addendum Sample			Barium	86-106	785	363	10	73
			Beryllium	78-108	93	89	15	4
			Cadmium	80-108	90	86	14	5
			Chromium	79-109	89	72	15	21
			Cobalt	85-105	90	86	10	5
			Copper	84-108	1364	-2198	12	<1
			Lead	79-109	6469	3537	15	59
			Nickel	78-106	102	87	14	16
			Silver	73-107	70	65	17	7
			Thallium	75-111	101	96	18	5
			Vanadium	87-105	94	88	9	7
			Zinc	76-112	224	117	18	63

ATTACHMENT E-6a

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SAMPLE SUMMARY
FOR SOIL SAMPLES
(Page 22 of 22)

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
SB-48-001B	9.5	6/9/94	Antimony	79-109	89	89	15	<1
Addendum Sample			Barium	86-106	101	91	10	10
			Beryllium	78-108	89	86	15	3
			Cadmium	80-108	88	87	14	1
			Chromium	79-109	87	89	15	2
			Cobalt	85-105	86	84	10	2
			Copper	84-108	91	89	12	2
			Lead	79-109	86	84	15	2
			Nickel	78-106	87	84	14	4
			Silver	73-107	87	87	17	<1
			Thallium	75-111	91	91	18	<1
			Vanadium	87-105	88	85	9	3
			Zinc	76-112	92	85	18	8
August 1995 Sampling								
SB-48-001B	9.5	6/9/94	Chromium	79-109	104	104	15	<1
			Hexavalent Chromium	79-109	82	84	15	2

GFAA Graphite furnace atomic absorption
CVAA Cold vapor atomic absorption
ICP Inductively coupled plasma

ATTACHMENT E-6b

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY
FOR WATER SAMPLES

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
Volatile Organic Compounds by GC/MS								
N-142-93	377	11/22/93	Benzene	76-127	90.8	88.6	11	2
			Chlorobenzene	89-107	97.6	97.0	9	<1
			1,1-Dichloroethylene	61-145	99.4	89.4	14	11
			Toluene	76-125	91.6	90.8	13	<1
			Trichloroethene	71-120	96.4	95.0	14	1
Semivolatile Organic Compounds								
N-142-93	377	11/22/93	4-Chloro-3-methylphenol	23-97	**115.0**	**109.0**	42	5
			1,4-Dichlorobenzene	36-97	75.8	73.4	28	3
			2,4-Dinitrotoluene	24-96	90.6	86.2	38	5
			4-Nitrophenol	10-80	70.9	66.4	50	7
			N-nitroso-di-n-propylamine	41-116	89.0	87.6	38	2
			Pentachlorophenol	9-103	**104.0**	100.0	50	4
			Phenol	12-89	75.7	71.8	42	5
			Pyrene	26-127	111.6	114.8	31	3
			1,2,4-Trichlorobenzene	39-98	82.8	76.2	28	8
			2-Chlorophenol	27-123	91.0	89.4	40	2
			Acenaphthene	46-118	84.8	82.6	31	3
N-142-93DUP	377	2/1/94	4-Chloro-3-methylphenol	23-97	82.7	79.6	42	4
			1,4-Dichlorobenzene	36-97	60.8	55.0	28	10
			2,4-Dinitrotoluene	24-96	58.6	58.6	38	<1
			4-Nitrophenol	10-80	42.0	46.7	50	11
			N-nitroso-di-n-propylamine	41-116	73.8	76.0	38	3
			Pentachlorophenol	9-103	75.7	72.7	50	4
			Phenol	12-89	68.8	74.5	42	8
			Pyrene	26-127	93.8	84.8	31	10
			1,2,4-Trichlorobenzene	39-98	58.4	54.6	28	7
			2-Chlorophenol	27-123	80.4	76.7	40	5

ATTACHMENT E-6b

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY
FOR WATER SAMPLES
(Page 2 of 4)

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
			Acenaphthene	46-118	67.2	66.6	31	<1

ATTACHMENT E-6b

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY
FOR WATER SAMPLES
(Page 3 of 4)

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
Organochlorine Pesticides								
N-142-93	377	11/22/93	g-BHC (Lindane)	43-145	60.9	63.1	51	4
			Aldrin	37-127	51.3	61.9	45	19
			DDT, pp	46-152	73.8	75.8	53	3
			Dieldrin	56-142	84.8	87.1	43	3
			Endosulfan, A	43-153	80.0	82.5	30	3
			Endosulfan, B	0-202	101.8	102.3	30	<1
			Endrin	35-155	84.0	85.4	60	2
			Heptachlor	48-124	59.3	67.4	38	13
			Isodrin	74-128	**55.8**	**64.9**	27	15
			Methoxychlor	78-126	97.5	98.8	44	1
Explosives								
SW-21-001	0	10/7/93	2,4-DNT	60-102	98.2	**102.6**	21	4
			RDX	51-111	87.1	83.6	30	4
			1,3,5-TNB	46-102	91.4	90.3	28	1
			Nitrobenzene	44-108	88.0	83.1	32	6
			2,4,6-TNT	48-124	84.3	84.3	38	<1
N-143-93	346	11/23/93	2,4-DNT	60-102	94.1	95.6	21	2
			RDX	51-111	97.2	97.2	30	<1
			1,3,5-TNB	46-102	98.3	98.2	28	<1
			Nitrobenzene	44-108	88.0	88.0	32	<1
			2,4,6-TNT	48-124	97.0	96.3	38	<1
N-142-93	377	2/1/94	2,4-DNT	60-102	68.0	78.4	21	14
			RDX	51-111	86.7	85.5	30	1
			1,3,5-TNB	46-102	77.1	80.9	28	5
			Nitrobenzene	44-108	82.0	97.3	32	17
			2,4,6-TNT	48-124	80.4	84.9	38	5

ATTACHMENT E-6b

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY
FOR WATER SAMPLES
(Page 4 of 4)

Sample Identification	Depth (feet)	Date Collected	Parameter	Recovery Limits (%)	Matrix Spike Recovery (%)	Matrix Spike Duplicate Recovery (%)	RPD Limit (%)	Actual RPD (%)
GFAA Metals								
SW-21-001	0	10/7/93	Arsenic	72-120	116.5	112.5	24	3
			Lead	71-125	103.0	103.8	27	<1
			Selenium	71-129	90.9	92.5	29	2
			Thallium	74-128	**51.0**	**51.0**	27	<1
CVAA Metals								
WW-3	700	8/4/93	Mercury	83-125	97.5	97.5	21	<1
ICP Metals								
WW-3DUP	700	8/4/93	Antimony	79-109	92.4	90.2	15	2
			Barium	86-106	92.2	92.7	10	<1
			Beryllium	78-108	94.6	92.4	15	2
			Cadmium	80-108	94.6	94.8	14	<1
			Chromium	79-109	93.2	92.2	15	1
			Cobalt	85-105	90.6	89.8	10	<1
			Copper	84-108	93.4	92.6	12	<1
			Nickel	78-106	89.7	86.7	14	3
			Silver	73-107	101.1	96.1	17	5
			Vanadium	87-105	92.9	92.1	9	<1
			Zinc	76-112	90.1	89.5	18	<1

GFAA Graphite furance
CVAA Cold vapor atomic absorption
ICP Inductively coupled plasma

ATTACHMENT E-7

SURROGATE RECOVERIES

ATTACHMENT E-7a

SURROGATE RECOVERIES FOR SOIL SAMPLES
(Page 1 of 18)

Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
Volatile Organic Compounds					
TNSOIL2*267	SB-42-048A	0.0	4-Bromofluorobenzene	96	74-121
			1,2-Dichloroethane-D4	102	85-115
			Toluene-D8	104	81-117
TNSOIL2*268	SB-42-048B	5.0	4-Bromofluorobenzene	100	74-121
			1,2-Dichloroethane-D4	104	85-115
			Toluene-D8	104	81-117
TNSOIL2*269	SB-42-049A	0.0	4-Bromofluorobenzene	102	74-121
			1,2-Dichloroethane-D4	104	85-115
			Toluene-D8	102	81-117
TNSOIL2*270	SB-42-049B	5.0	4-Bromofluorobenzene	102	74-121
			1,2-Dichloroethane-D4	104	85-115
			Toluene-D8	102	81-117
TNSOIL2*277	SB-42-049A DUP	0.0	4-Bromofluorobenzene	100	74-121
			1,2-Dichloroethane-D4	100	85-115
			Toluene-D8	100	81-117
	Addendum Samples				
TNSOIL2*315	SB-42-050A	0.5	4-Bromofluorobenzene	92	74-121
			1,2-Dichloroethane-D4	98	85-115
			Toluene-D8	102	81-117
TNSOIL2*319	SB-42-050A DUP	0.5	4-Bromofluorobenzene	84	74-121
			1,2-Dichloroethane-D4	100	85-115
			Toluene-D8	90	81-117
TNSOIL2*316	SB-42-050B	1.0	4-Bromofluorobenzene	96	74-121
			1,2-Dichloroethane-D4	106	85-115
			Toluene-D8	100	81-117
TNSOIL2*317	SB-42-051A	0.5	4-Bromofluorobenzene	98	74-121
			1,2-Dichloroethane-D4	112	85-115
			Toluene-D8	108	81-117
TNSOIL2*318	SB-42-051B	2.0	4-Bromofluorobenzene	100	74-121
			1,2-Dichloroethane-D4	110	85-115
			Toluene-D8	104	81-117
TNSOIL2*320	SB-45-002A	8.0	4-Bromofluorobenzene	94	74-121
			1,2-Dichloroethane-D4	98	85-115
			Toluene-D8	102	81-117
TNSOIL2*321	SB-45-002B	12.0	4-Bromofluorobenzene	96	74-121
			1,2-Dichloroethane-D4	96	85-115
			Toluene-D8	100	81-117
TNSOIL2*322	SB-45-003A	8.0	4-Bromofluorobenzene	94	74-121
			1,2-Dichloroethane-D4	98	85-115
			Toluene-D8	98	81-117

ATTACHMENT E-7a

SURROGATE RECOVERIES FOR SOIL SAMPLES

Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*323	SB-45-003B	10.0	4-Bromofluorobenzene	100	74-121
			1,2-Dichloroethane-D4	92	85-115
			Toluene-D8	102	81-117
TNSOIL2*324	SB-45-004A	6.5	4-Bromofluorobenzene	98	74-121
			1,2-Dichloroethane-D4	98	85-115
			Toluene-D8	100	81-117
TNSOIL2*325	SB-45-004B	9.0	4-Bromofluorobenzene	90	74-121
			1,2-Dichloroethane-D4	86	85-115
			Toluene-D8	96	81-117
TNSOIL2*326	SB-45-005A	12.0	4-Bromofluorobenzene	92	74-121
			1,2-Dichloroethane-D4	90	85-115
			Toluene-D8	96	81-117
TNSOIL2*328	SB-45-006A	10.0	4-Bromofluorobenzene	86	74-121
			1,2-Dichloroethane-D4	88	85-115
			Toluene-D8	90	81-117
TNSOIL2*329	SB-45-006B	11.5	4-Bromofluorobenzene	96	74-121
			1,2-Dichloroethane-D4	96	85-115
			Toluene-D8	98	81-117
TNSOIL2*330	SB-45-007A	10.5	4-Bromofluorobenzene	98	74-121
			1,2-Dichloroethane-D4	92	85-115
			Toluene-D8	100	81-117
TNSOIL2*331	SB-45-007B	12.0	4-Bromofluorobenzene	90	74-121
			1,2-Dichloroethane-D4	92	85-115
			Toluene-D8	96	81-117
TNSOIL2*360	SB-45-007B DUP	12.0	4-Bromofluorobenzene	92	74-121
			1,2-Dichloroethane-D4	92	85-115
			Toluene-D8	98	81-117
TNSOIL2*332	SB-45-008A	7.0	4-Bromofluorobenzene	90	74-121
			1,2-Dichloroethane-D4	96	85-115
			Toluene-D8	94	81-117
TNSOIL2*361	SB-45-008A DUP	7.0	4-Bromofluorobenzene	98	74-121
			1,2-Dichloroethane-D4	104	85-115
			Toluene-D8	96	81-117
TNSOIL2*333	SB-45-008B	10.0	4-Bromofluorobenzene	94	74-121
			1,2-Dichloroethane-D4	92	85-115
			Toluene-D8	98	81-117
TNSOIL2*334	SB-45-009A	8.0	4-Bromofluorobenzene	94	74-121
			1,2-Dichloroethane-D4	90	85-115
			Toluene-D8	96	81-117
TNSOIL2*335	SB-45-009B	11.0	4-Bromofluorobenzene	88	74-121
			1,2-Dichloroethane-D4	100	85-115
			Toluene-D8	94	81-117

ATTACHMENT E-7a

SURROGATE RECOVERIES FOR SOIL SAMPLES

Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*336	SB-45-010A	7.0	4-Bromofluorobenzene	86	74-121
			1,2-Dichloroethane-D4	98	85-115
			Toluene-D8	94	81-117
TNSOIL2*338	SB-45-011A	9.0	4-Bromofluorobenzene	84	74-121
			1,2-Dichloroethane-D4	94	85-115
			Toluene-D8	96	81-117
TNSOIL2*339	SB-45-011B	10.5	4-Bromofluorobenzene	98	74-121
			1,2-Dichloroethane-D4	102	85-115
			Toluene-D8	102	81-117
TNSOIL2*369	SB-45-012A	8.5	4-Bromofluorobenzene	98	74-121
			1,2-Dichloroethane-D4	106	85-115
			Toluene-D8	98	81-117
TNSOIL2*375	SB-45-012A DUP	8.5	4-Bromofluorobenzene	96	74-121
			1,2-Dichloroethane-D4	104	85-115
			Toluene-D8	98	81-117
TNSOIL2*370	SB-45-012B	10.0	4-Bromofluorobenzene	96	74-121
			1,2-Dichloroethane-D4	104	85-115
			Toluene-D8	96	81-117
TNSOIL2*371	SB-45-013A	7.0	4-Bromofluorobenzene	94	74-121
			1,2-Dichloroethane-D4	100	85-115
			Toluene-D8	98	81-117
TNSOIL2*372	SB-45-013B	9.0	4-Bromofluorobenzene	100	74-121
			1,2-Dichloroethane-D4	104	85-115
			Toluene-D8	102	81-117
TNSOIL2*373	SB-45-014A	8.5	4-Bromofluorobenzene	104	74-121
			1,2-Dichloroethane-D4	110	85-115
			Toluene-D8	102	81-117
TNSOIL2*374	SB-45-014B	10.5	4-Bromofluorobenzene	92	74-121
			1,2-Dichloroethane-D4	100	85-115
			Toluene-D8	92	81-117
TNSOIL2*346	SB-45-015A	8.0	4-Bromofluorobenzene	100	74-121
			1,2-Dichloroethane-D4	106	85-115
			Toluene-D8	104	81-117
TNSOIL2*365	SB-48-001A	4.0	4-Bromofluorobenzene	74	74-121
			1,2-Dichloroethane-D4	100	85-115
			Toluene-D8	112	81-117
TNSOIL2*362	SB-48-001A DUP	4.0	4-Bromofluorobenzene	88	74-121
			1,2-Dichloroethane-D4	96	85-115
			Toluene-D8	96	81-117
TNSOIL2*385	SB-48-001B	9.5	4-Bromofluorobenzene	96	74-121
			1,2-Dichloroethane-D4	106	85-115
			Toluene-D8	98	81-117

ATTACHMENT E-7a

SURROGATE RECOVERIES FOR SOIL SAMPLES

Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*367	SB-48-002A	3.5	4-Bromofluorobenzene	96	74-121
			1,2-Dichloroethane-D4	98	85-115
			Toluene-D8	104	81-117
TNSOIL2*368	SB-48-002B	10.0	4-Bromofluorobenzene	96	74-121
			1,2-Dichloroethane-D4	102	85-115
			Toluene-D8	100	81-117
Semivolatile Organic Compounds					
TNSOIL2*120	SS-37-013	0.0	Nitrobenzene-D5	76	23-120
			Phenol-D5	66	24-113
			2-Fluorophenol	72	25-121
			2,4,6-Tribromophenol	75	20-140
			Terphenyl-D14	85	20-140
			2-Fluorobiphenyl	76	30-115
TNSOIL2*121	SS-37-014	0.0	Nitrobenzene-D5	88	23-120
			Phenol-D5	75	24-113
			2-Fluorophenol	82	25-121
			2,4,6-Tribromophenol	79	20-140
			Terphenyl-D14	82	20-140
			2-Fluorobiphenyl	79	30-115
TNSOIL2*122	SS-37-015	0.0	Nitrobenzene-D5	67	23-120
			Phenol-D5	58	24-113
			2-Fluorophenol	66	25-121
			2,4,6-Tribromophenol	69	20-140
			Terphenyl-D14	79	20-140
			2-Fluorobiphenyl	67	30-115
TNSOIL2*123	SS-37-016	0.0	Nitrobenzene-D5	76	23-120
			Phenol-D5	70	24-113
			2-Fluorophenol	75	25-121
			2,4,6-Tribromophenol	76	20-140
			Terphenyl-D14	73	20-140
			2-Fluorobiphenyl	73	30-115
TNSOIL2*124	SS-37-017	0.0	Nitrobenzene-D5	88	23-120
			Phenol-D5	75	24-113
			2-Fluorophenol	84	25-121
			2,4,6-Tribromophenol	79	20-140
			Terphenyl-D14	85	20-140
			2-Fluorobiphenyl	76	30-115
TNSOIL2*125	SS-37-018	0.0	Nitrobenzene-D5	88	23-120
			Phenol-D5	73	24-113
			2-Fluorophenol	81	25-121
			2,4,6-Tribromophenol	79	20-140
			Terphenyl-D14	82	20-140
			2-Fluorobiphenyl	82	30-115

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SURROGATE RECOVERIES FOR SOIL SAMPLES

Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*126	SS-37-019	0.0	Nitrobenzene-D5	76	23-120
			Phenol-D5	64	24-113
			2-Fluorophenol	72	25-121
			2,4,6-Tribromophenol	72	20-140
			Terphenyl-D14	76	20-140
			2-Fluorobiphenyl	79	30-115
TNSOIL2*127	SS-37-020	0.0	Nitrobenzene-D5	73	23-120
			Phenol-D5	54	24-113
			2-Fluorophenol	58	25-121
			2,4,6-Tribromophenol	73	20-140
			Terphenyl-D14	76	20-140
			2-Fluorobiphenyl	70	30-115
TNSOIL2*128	SS-37-014 DUP	0.0	Nitrobenzene-D5	76	23-120
			Phenol-D5	66	24-113
			2-Fluorophenol	72	25-121
			2,4,6-Tribromophenol	75	20-140
			Terphenyl-D14	79	20-140
			2-Fluorobiphenyl	79	30-115
TNSOIL2*129	SB-37-001A	0.0	Nitrobenzene-D5	85	23-120
			Phenol-D5	75	24-113
			2-Fluorophenol	82	25-121
			2,4,6-Tribromophenol	69	20-140
			Terphenyl-D14	85	20-140
			2-Fluorobiphenyl	76	30-115
TNSOIL2*130	SB-37-001B	1.5	Nitrobenzene-D5	85	23-120
			Phenol-D5	76	24-113
			2-Fluorophenol	85	25-121
			2,4,6-Tribromophenol	70	20-140
			Terphenyl-D14	91	20-140
			2-Fluorobiphenyl	76	30-115
TNSOIL2*131	SB-37-001C 3	3.0	Nitrobenzene-D5	85	23-120
			Phenol-D5	69	24-113
			2-Fluorophenol	81	25-121
			2,4,6-Tribromophenol	72	20-140
			Terphenyl-D14	82	20-140
			2-Fluorobiphenyl	82	30-115
TNSOIL2*132	SB-37-002A 0	0.0	Nitrobenzene-D5	82	23-120
			Phenol-D5	70	24-113
			2-Fluorophenol	82	25-121
			2,4,6-Tribromophenol	72	20-140
			Terphenyl-D14	94	20-140
			2-Fluorobiphenyl	79	30-115
TNSOIL2*133	SB-37-002B	1.5	Nitrobenzene-D5	76	23-120
			Phenol-D5	66	24-113
			2-Fluorophenol	72	25-121
			2,4,6-Tribromophenol	64	20-140
			Terphenyl-D14	94	20-140
			2-Fluorobiphenyl	73	30-115

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SURROGATE RECOVERIES FOR SOIL SAMPLES

Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*134	SB-37-002C	3.0	Nitrobenzene-D5	79	23-120
			Phenol-D5	66	24-113
			2-Fluorophenol	76	25-121
			2,4,6-Tribromophenol	70	20-140
			Terphenyl-D14	133	20-140
			2-Fluorobiphenyl	76	30-115
TNSOIL2*135	SB-37-003A	0.0	Nitrobenzene-D5	73	23-120
			Phenol-D5	61	24-113
			2-Fluorophenol	66	25-121
			2,4,6-Tribromophenol	67	20-140
			Terphenyl-D14	97	20-140
			2-Fluorobiphenyl	70	30-115
TNSOIL2*136	SB-37-003B	1.5	Nitrobenzene-D5	61	23-120
			Phenol-D5	52	24-113
			2-Fluorophenol	54	25-121
			2,4,6-Tribromophenol	61	20-140
			Terphenyl-D14	82	20-140
			2-Fluorobiphenyl	64	30-115
TNSOIL2*137	SB-37-003C	3.0	Nitrobenzene-D5	76	23-120
			Phenol-D5	75	24-113
			2-Fluorophenol	76	25-121
			2,4,6-Tribromophenol	58	20-140
			Terphenyl-D14	55	20-140
			2-Fluorobiphenyl	79	30-115
TNSOIL2*138	SB-37-004A	0.0	Nitrobenzene-D5	70	23-120
			Phenol-D5	70	24-113
			2-Fluorophenol	72	25-121
			2,4,6-Tribromophenol	55	20-140
			Terphenyl-D14	67	20-140
			2-Fluorobiphenyl	73	30-115
TNSOIL2*139	SB-37-004B	1.5	Nitrobenzene-D5	73	23-120
			Phenol-D5	69	24-113
			2-Fluorophenol	73	25-121
			2,4,6-Tribromophenol	54	20-140
			Terphenyl-D14	73	20-140
			2-Fluorobiphenyl	73	30-115
TNSOIL2*140	SB-37-004C	3.0	Nitrobenzene-D5	61	23-120
			Phenol-D5	57	24-113
			2-Fluorophenol	60	25-121
			2,4,6-Tribromophenol	54	20-140
			Terphenyl-D14	73	20-140
			2-Fluorobiphenyl	70	30-115
TNSOIL2*141	SB-37-005A	0.0	Nitrobenzene-D5	70	23-120
			Phenol-D5	70	24-113
			2-Fluorophenol	70	25-121
			2,4,6-Tribromophenol	58	20-140
			Terphenyl-D14	67	20-140
			2-Fluorobiphenyl	73	30-115

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SURROGATE RECOVERIES FOR SOIL SAMPLES
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Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*142	SB-37-005B	1.5	Nitrobenzene-D5	73	23-120
			Phenol-D5	73	24-113
			2-Fluorophenol	73	25-121
			2,4,6-Tribromophenol	61	20-140
			Terphenyl-D14	67	20-140
			2-Fluorobiphenyl	73	30-115
TNSOIL2*143	SB-37-005C	3.0	Nitrobenzene-D5	76	23-120
			Phenol-D5	78	24-113
			2-Fluorophenol	78	25-121
			2,4,6-Tribromophenol	58	20-140
			Terphenyl-D14	61	20-140
			2-Fluorobiphenyl	79	30-115
TNSOIL2*144	SB-37-006A	0.0	Nitrobenzene-D5	70	23-120
			Phenol-D5	67	24-113
			2-Fluorophenol	70	25-121
			2,4,6-Tribromophenol	61	20-140
			Terphenyl-D14	64	20-140
			2-Fluorobiphenyl	70	30-115
TNSOIL2*145	SB-37-006B	1.5	Nitrobenzene-D5	58	23-120
			Phenol-D5	46	24-113
			2-Fluorophenol	58	25-121
			2,4,6-Tribromophenol	45	20-140
			Terphenyl-D14	64	20-140
			2-Fluorobiphenyl	70	30-115
TNSOIL2*146	SB-37-006C	3.0	Nitrobenzene-D5	76	23-120
			Phenol-D5	72	24-113
			2-Fluorophenol	73	25-121
			2,4,6-Tribromophenol	64	20-140
			Terphenyl-D14	64	20-140
			2-Fluorobiphenyl	76	30-115
TNSOIL2*151	SB-37-006A DUP	0.0	Nitrobenzene-D5	67	23-120
			Phenol-D5	66	24-113
			2-Fluorophenol	69	25-121
			2,4,6-Tribromophenol	55	20-140
			Terphenyl-D14	61	20-140
			2-Fluorobiphenyl	67	30-115
TNSOIL2*152	SB-37-006C DUP	3.0	Nitrobenzene-D5	70	23-120
			Phenol-D5	72	24-113
			2-Fluorophenol	73	25-121
			2,4,6-Tribromophenol	63	20-140
			Terphenyl-D14	64	20-140
			2-Fluorobiphenyl	76	30-115
TNSOIL2*267	SB-42-048A	0.0	Nitrobenzene-D5	23	23-120
			Phenol-D5	49	24-113
			2-Fluorophenol	61	25-121
			2,4,6-Tribromophenol	0	20-140
			Terphenyl-D14	70	20-140
			2-Fluorobiphenyl	67	30-115

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SURROGATE RECOVERIES FOR SOIL SAMPLES
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Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*268	SB-42-048B	5.0	Nitrobenzene-D5	91	23-120
			Phenol-D5	90	24-113
			2-Fluorophenol	93	25-121
			2,4,6-Tribromophenol	78	20-140
			Terphenyl-D14	91	20-140
			2-Fluorobiphenyl	88	30-115
TNSOIL2*269	SB-42-049A	0.0	Nitrobenzene-D5	26	23-120
			Phenol-D5	51	24-113
			2-Fluorophenol	58	25-121
			2,4,6-Tribromophenol	0	20-140
			Terphenyl-D14	79	20-140
			2-Fluorobiphenyl	79	30-115
TNSOIL2*270	SB-42-049B	5.0	Nitrobenzene-D5	88	23-120
			Phenol-D5	81	24-113
			2-Fluorophenol	79	25-121
			2,4,6-Tribromophenol	70	20-140
			Terphenyl-D14	79	20-140
			2-Fluorobiphenyl	76	30-115
TNSOIL2*277	SB-42-049A DUP	0.0	Nitrobenzene-D5	61	23-120
			Phenol-D5	66	24-113
			2-Fluorophenol	73	25-121
			2,4,6-Tribromophenol	79	20-140
			Terphenyl-D14	97	20-140
			2-Fluorobiphenyl	91	30-115
TNSOIL2*287	SB-37-007A	0.0	Nitrobenzene-D5	97	23-120
			Phenol-D5	87	24-113
			2-Fluorophenol	94	25-121
			2,4,6-Tribromophenol	61	20-140
			Terphenyl-D14	70	20-140
			2-Fluorobiphenyl	91	30-115
TNSOIL2*288	SB-37-007B	1.5	Nitrobenzene-D5	91	23-120
			Phenol-D5	75	24-113
			2-Fluorophenol	78	25-121
			2,4,6-Tribromophenol	58	20-140
			Terphenyl-D14	55	20-140
			2-Fluorobiphenyl	76	30-115
TNSOIL2*289	SB-37-007C	3.0	Nitrobenzene-D5	85	23-120
			Phenol-D5	82	24-113
			2-Fluorophenol	85	25-121
			2,4,6-Tribromophenol	93	20-140
			Terphenyl-D14	79	20-140
			2-Fluorobiphenyl	85	30-115
	Addendum Samples				
TNSOIL2*315	SB-42-050A	0.5	Nitrobenzene-D5	100	23-120
			Phenol-D5	108	24-113
			2-Fluorophenol	125	25-121
			2,4,6-Tribromophenol	75	20-140
			Terphenyl-D14	73	20-140
			2-Fluorobiphenyl	100	30-115

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SURROGATE RECOVERIES FOR SOIL SAMPLES
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Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*319	SB-42-050A DUP	0.5	Nitrobenzene-D5	109	23-120
			Phenol-D5	113	24-113
			2-Fluorophenol	128	25-121
			2,4,6-Tribromophenol	67	20-140
			Terphenyl-D14	97	20-140
			2-Fluorobiphenyl	106	30-115
TNSOIL2*316	SB-42-050B	1.0	Nitrobenzene-D5	100	23-120
			Phenol-D5	113	24-113
			2-Fluorophenol	125	25-121
			2,4,6-Tribromophenol	69	20-140
			Terphenyl-D14	82	20-140
			2-Fluorobiphenyl	91	30-115
TNSOIL2*317	SB-42-051A	0.5	Nitrobenzene-D5	97	23-120
			Phenol-D5	118	24-113
			2-Fluorophenol	121	25-121
			2,4,6-Tribromophenol	73	20-140
			Terphenyl-D14	88	20-140
			2-Fluorobiphenyl	100	30-115
TNSOIL2*318	SB-42-051B	2.0	Nitrobenzene-D5	109	23-120
			Phenol-D5	125	24-113
			2-Fluorophenol	133	25-121
			2,4,6-Tribromophenol	69	20-140
			Terphenyl-D14	73	20-140
			2-Fluorobiphenyl	103	30-115
TNSOIL2*320	SB-45-002A	8.0	Nitrobenzene-D5	76	23-120
			Phenol-D5	84	24-113
			2-Fluorophenol	79	25-121
			2,4,6-Tribromophenol	100	20-140
			Terphenyl-D14	97	20-140
			2-Fluorobiphenyl	100	30-115
TNSOIL2*321	SB-45-002B	12.0	Nitrobenzene-D5	76	23-120
			Phenol-D5	94	24-113
			2-Fluorophenol	87	25-121
			2,4,6-Tribromophenol	94	20-140
			Terphenyl-D14	91	20-140
			2-Fluorobiphenyl	103	30-115
TNSOIL2*322	SB-45-003A	8.0	Nitrobenzene-D5	85	23-120
			Phenol-D5	91	24-113
			2-Fluorophenol	82	25-121
			2,4,6-Tribromophenol	96	20-140
			Terphenyl-D14	100	20-140
			2-Fluorobiphenyl	91	30-115
TNSOIL2*323	SB-45-003B	10.0	Nitrobenzene-D5	70	23-120
			Phenol-D5	76	24-113
			2-Fluorophenol	69	25-121
			2,4,6-Tribromophenol	82	20-140
			Terphenyl-D14	88	20-140
			2-Fluorobiphenyl	76	30-115

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SURROGATE RECOVERIES FOR SOIL SAMPLES
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Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*324	SB-45-004A	6.5	Nitrobenzene-D5	76	23-120
			Phenol-D5	84	24-113
			2-Fluorophenol	84	25-121
			2,4,6-Tribromophenol	75	20-140
			Terphenyl-D14	88	20-140
			2-Fluorobiphenyl	79	30-115
TNSOIL2*325	SB-45-004A	9.0	Nitrobenzene-D5	76	23-120
			Phenol-D5	81	24-113
			2-Fluorophenol	85	25-121
			2,4,6-Tribromophenol	73	20-140
			Terphenyl-D14	91	20-140
			2-Fluorobiphenyl	82	30-115
TNSOIL2*326	SB-45-005A	12.0	Nitrobenzene-D5	76	23-120
			Phenol-D5	84	24-113
			2-Fluorophenol	81	25-121
			2,4,6-Tribromophenol	88	20-140
			Terphenyl-D14	88	20-140
			2-Fluorobiphenyl	88	30-115
TNSOIL2*328	SB-45-006A	10.0	Nitrobenzene-D5	79	23-120
			Phenol-D5	85	24-113
			2-Fluorophenol	90	25-121
			2,4,6-Tribromophenol	88	20-140
			Terphenyl-D14	88	20-140
			2-Fluorobiphenyl	91	30-115
TNSOIL2*329	SB-45-006B	11.5	Nitrobenzene-D5	73	23-120
			Phenol-D5	78	24-113
			2-Fluorophenol	81	25-121
			2,4,6-Tribromophenol	78	20-140
			Terphenyl-D14	85	20-140
			2-Fluorobiphenyl	85	30-115
TNSOIL2*330	SB-45-007A	10.5	Nitrobenzene-D5	70	23-120
			Phenol-D5	78	24-113
			2-Fluorophenol	81	25-121
			2,4,6-Tribromophenol	79	20-140
			Terphenyl-D14	88	20-140
			2-Fluorobiphenyl	79	30-115
TNSOIL2*331	SB-45-007B	12.0	Nitrobenzene-D5	73	23-120
			Phenol-D5	79	24-113
			2-Fluorophenol	84	25-121
			2,4,6-Tribromophenol	58	20-140
			Terphenyl-D14	88	20-140
			2-Fluorobiphenyl	82	30-115
TNSOIL2*360	SB-45-007B DUP	12.0	Nitrobenzene-D5	91	23-120
			Phenol-D5	90	24-113
			2-Fluorophenol	84	25-121
			2,4,6-Tribromophenol	78	20-140
			Terphenyl-D14	88	20-140
			2-Fluorobiphenyl	82	30-115

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SURROGATE RECOVERIES FOR SOIL SAMPLES
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Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*332	SB-45-008A	7.0	Nitrobenzene-D5	85	23-120
			Phenol-D5	81	24-113
			2-Fluorophenol	84	25-121
			2,4,6-Tribromophenol	76	20-140
			Terphenyl-D14	88	20-140
			2-Fluorobiphenyl	82	30-115
TNSOIL2*361	SB-45-008A DUP	7.0	Nitrobenzene-D5	85	23-120
			Phenol-D5	84	24-113
			2-Fluorophenol	79	25-121
			2,4,6-Tribromophenol	75	20-140
			Terphenyl-D14	91	20-140
			2-Fluorobiphenyl	91	30-115
TNSOIL2*333	SB-45-008B	10.0	Nitrobenzene-D5	73	23-120
			Phenol-D5	79	24-113
			2-Fluorophenol	85	25-121
			2,4,6-Tribromophenol	82	20-140
			Terphenyl-D14	100	20-140
			2-Fluorobiphenyl	82	30-115
TNSOIL2*334	SB-45-009A	8.0	Nitrobenzene-D5	82	23-120
			Phenol-D5	91	24-113
			2-Fluorophenol	91	25-121
			2,4,6-Tribromophenol	72	20-140
			Terphenyl-D14	94	20-140
			2-Fluorobiphenyl	88	30-115
TNSOIL2*335	SB-45-009B	11.0	Nitrobenzene-D5	76	23-120
			Phenol-D5	84	24-113
			2-Fluorophenol	84	25-121
			2,4,6-Tribromophenol	79	20-140
			Terphenyl-D14	91	20-140
			2-Fluorobiphenyl	85	30-115
TNSOIL2*336	SB-45-010A	7.0	Nitrobenzene-D5	76	23-120
			Phenol-D5	84	24-113
			2-Fluorophenol	85	25-121
			2,4,6-Tribromophenol	75	20-140
			Terphenyl-D14	88	20-140
			2-Fluorobiphenyl	82	30-115
TNSOIL2*338	SB-45-011A	9.0	Nitrobenzene-D5	85	23-120
			Phenol-D5	90	24-113
			2-Fluorophenol	85	25-121
			2,4,6-Tribromophenol	79	20-140
			Terphenyl-D14	88	20-140
			2-Fluorobiphenyl	91	30-115
TNSOIL2*339	SB-45-011B	10.5	Nitrobenzene-D5	79	23-120
			Phenol-D5	87	24-113
			2-Fluorophenol	81	25-121
			2,4,6-Tribromophenol	75	20-140
			Terphenyl-D14	94	20-140
			2-Fluorobiphenyl	94	30-115

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SURROGATE RECOVERIES FOR SOIL SAMPLES

Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*340	SB-45-012A	8.5	Nitrobenzene-D5	79	23-120
			Phenol-D5	66	24-113
			2-Fluorophenol	72	25-121
			2,4,6-Tribromophenol	51	20-140
			Terphenyl-D14	82	20-140
			2-Fluorobiphenyl	76	30-115
TNSOIL2*341	SB-45-012B	10.5	Nitrobenzene-D5	76	23-120
			Phenol-D5	64	24-113
			2-Fluorophenol	73	25-121
			2,4,6-Tribromophenol	46	20-140
			Terphenyl-D14	70	20-140
			2-Fluorobiphenyl	73	30-115
TNSOIL2*342	SB-45-013A	7.0	Nitrobenzene-D5	64	23-120
			Phenol-D5	49	24-113
			2-Fluorophenol	57	25-121
			2,4,6-Tribromophenol	39	20-140
			Terphenyl-D14	58	20-140
			2-Fluorobiphenyl	64	30-115
TNSOIL2*363	SB-45-013A DUP	7.0	Nitrobenzene-D5	58	23-120
			Phenol-D5	46	24-113
			2-Fluorophenol	51	25-121
			2,4,6-Tribromophenol	43	20-140
			Terphenyl-D14	73	20-140
			2-Fluorobiphenyl	67	30-115
TNSOIL2*343	SB-45-013B	9.0	Nitrobenzene-D5	91	23-120
			Phenol-D5	76	24-113
			2-Fluorophenol	90	25-121
			2,4,6-Tribromophenol	52	20-140
			Terphenyl-D14	64	20-140
			2-Fluorobiphenyl	88	30-115
TNSOIL2*344	SB-45-014A	9.0	Nitrobenzene-D5	52	23-120
			Phenol-D5	34	24-113
			2-Fluorophenol	42	25-121
			2,4,6-Tribromophenol	36	20-140
			Terphenyl-D14	58	20-140
			2-Fluorobiphenyl	52	30-115
TNSOIL2*345	SB-45-014B	10.5	Nitrobenzene-D5	82	23-120
			Phenol-D5	67	24-113
			2-Fluorophenol	70	25-121
			2,4,6-Tribromophenol	49	20-140
			Terphenyl-D14	70	20-140
			2-Fluorobiphenyl	73	30-115
TNSOIL2*346	SB-45-015A	8.0	Nitrobenzene-D5	82	23-120
			Phenol-D5	90	24-113
			2-Fluorophenol	85	25-121
			2,4,6-Tribromophenol	79	20-140
			Terphenyl-D14	82	20-140
			2-Fluorobiphenyl	82	30-115

ATTACHMENT E-7a

SURROGATE RECOVERIES FOR SOIL SAMPLES

Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*365	SB-48-001A	4.0	Nitrobenzene-D5	70	23-120
			Phenol-D5	84	24-113
			2-Fluorophenol	79	25-121
			2,4,6-Tribromophenol	73	20-140
			Terphenyl-D14	82	20-140
			2-Fluorobiphenyl	85	30-115
TNSOIL2*362	SB-48-001A DUP	4.0	Nitrobenzene-D5	73	23-120
			Phenol-D5	81	24-113
			2-Fluorophenol	73	25-121
			2,4,6-Tribromophenol	67	20-140
			Terphenyl-D14	76	20-140
			2-Fluorobiphenyl	79	30-115
TNSOIL2*385	SB-48-001B	9.5	Nitrobenzene-D5	82	23-120
			Phenol-D5	94	24-113
			2-Fluorophenol	91	25-121
			2,4,6-Tribromophenol	72	20-140
			Terphenyl-D14	79	20-140
			2-Fluorobiphenyl	82	30-115
TNSOIL2*367	SB-48-002A	3.5	Nitrobenzene-D5	79	23-120
			Phenol-D5	85	24-113
			2-Fluorophenol	78	25-121
			2,4,6-Tribromophenol	84	20-140
			Terphenyl-D14	85	20-140
			2-Fluorobiphenyl	82	30-115
TNSOIL2*368	SB-48-002B	10.0	Nitrobenzene-D5	82	23-120
			Phenol-D5	88	24-113
			2-Fluorophenol	84	25-121
			2,4,6-Tribromophenol	72	20-140
			Terphenyl-D14	88	20-140
			2-Fluorobiphenyl	88	30-115
OC Pesticides/PCBs					
TNSOIL2*70	SB-34-0001A	0.0	Decachlorobiphenyl	70	32-156
			Tetrachloro-m-xylene	79	67-119
TNSOIL2*71	SB-34-0001B	6.0	Decachlorobiphenyl	69	32-156
			Tetrachloro-m-xylene	72	67-119
TNSOIL2*72	SB-34-0001C	10.0	Decachlorobiphenyl	72	32-156
			Tetrachloro-m-xylene	73	67-119
TNSOIL2*73	SB-34-0001D	15.0	Decachlorobiphenyl	76	32-156
			Tetrachloro-m-xylene	73	67-119
TNSOIL2*74	SB-34-0001E	20.0	Decachlorobiphenyl	76	32-156
			Tetrachloro-m-xylene	73	67-119
TNSOIL2*75	SB-34-0002A	0.0	Decachlorobiphenyl	76	32-156
			Tetrachloro-m-xylene	76	67-119
TNSOIL2*76	SB-34-0002B	5.0	Decachlorobiphenyl	67	32-156
			Tetrachloro-m-xylene	72	67-119

ATTACHMENT E-7a

SURROGATE RECOVERIES FOR SOIL SAMPLES

Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*78	SB-34-0002D	15.0	Decachlorobiphenyl	63	32-156
			Tetrachloro-m-xylene	60	67-119
TNSOIL2*80	SB-34-0003A	0.0	Decachlorobiphenyl	81	32-156
			Tetrachloro-m-xylene	79	67-119
TNSOIL2*81	SB-34-0003B	5.0	Decachlorobiphenyl	79	32-156
			Tetrachloro-m-xylene	75	67-119
TNSOIL2*82	SB-34-0003C	11.0	Decachlorobiphenyl	84	32-156
			Tetrachloro-m-xylene	82	67-119
TNSOIL2*83	SB-34-0003D	15.0	Decachlorobiphenyl	97	32-156
			Tetrachloro-m-xylene	96	67-119
TNSOIL2*84	SB-34-0003E	20.0	Decachlorobiphenyl	84	32-156
			Tetrachloro-m-xylene	82	67-119
TNSOIL2*85	SB-34-004A	0.0	Decachlorobiphenyl	60	32-156
			Tetrachloro-m-xylene	94	67-119
TNSOIL2*86	SB-34-004B	1.5	Decachlorobiphenyl	75	32-156
			Tetrachloro-m-xylene	81	67-119
TNSOIL2*87	SB-34-004C	3.0	Decachlorobiphenyl	45	32-156
			Tetrachloro-m-xylene	81	67-119
TNSOIL2*88	SB-34-005A	0.0	Decachlorobiphenyl	91	32-156
			Tetrachloro-m-xylene	87	67-119
TNSOIL2*89	SB-34-005B	1.5	Decachlorobiphenyl	108	32-156
			Tetrachloro-m-xylene	99	67-119
TNSOIL2*90	SB-34-005C	3.0	Decachlorobiphenyl	102	32-156
			Tetrachloro-m-xylene	91	67-119
TNSOIL2*91	SB-34-006A	0.0	Decachlorobiphenyl	90	32-156
			Tetrachloro-m-xylene	87	67-119
TNSOIL2*92	SB-34-006B	1.5	Decachlorobiphenyl	97	32-156
			Tetrachloro-m-xylene	86	67-119
TNSOIL2*93	SB-34-006C	3.0	Decachlorobiphenyl	78	32-156
			Tetrachloro-m-xylene	79	67-119
TNSOIL2*94	SB-34-007A	0.0	Decachlorobiphenyl	16	32-156
			Tetrachloro-m-xylene	64	67-119
TNSOIL2*95	SB-34-007B	1.5	Decachlorobiphenyl	21	32-156
			Tetrachloro-m-xylene	66	67-119
TNSOIL2*96	SB-34-007C	3.0	Decachlorobiphenyl	19	32-156
			Tetrachloro-m-xylene	70	67-119
TNSOIL2*97	SB-34-008A	0.0	Decachlorobiphenyl	33	32-156
			Tetrachloro-m-xylene	85	67-119

ATTACHMENT E-7a

SURROGATE RECOVERIES FOR SOIL SAMPLES

Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*98	SB-34-008B	1.5	Decachlorobiphenyl	33	32-156
			Tetrachloro-m-xylene	79	67-119
TNSOIL2*99	SB-34-008C	3.0	Decachlorobiphenyl	57	32-156
			Tetrachloro-m-xylene	78	67-119
TNSOIL2*100	SB-34-009A	0.0	Decachlorobiphenyl	64	32-156
			Tetrachloro-m-xylene	82	67-119
TNSOIL2*101	SB-34-009B	1.5	Decachlorobiphenyl	72	32-156
			Tetrachloro-m-xylene	84	67-119
TNSOIL2*102	SB-34-009C	3.0	Decachlorobiphenyl	63	32-156
			Tetrachloro-m-xylene	78	67-119
TNSOIL2*103	SB-34-010A	0.0	Decachlorobiphenyl	76	32-156
			Tetrachloro-m-xylene	82	67-119
TNSOIL2*104	SB-34-010B	1.5	Decachlorobiphenyl	70	32-156
			Tetrachloro-m-xylene	82	67-119
TNSOIL2*105	SB-34-010C	3.0	Decachlorobiphenyl	75	32-156
			Tetrachloro-m-xylene	93	67-119
TNSOIL2*106	SB-34-011A	0.0	Decachlorobiphenyl	52	32-156
			Tetrachloro-m-xylene	55	67-119
TNSOIL2*107	SB-34-011B	1.5	Decachlorobiphenyl	75	32-156
			Tetrachloro-m-xylene	84	67-119
TNSOIL2*108	SB-34-011C	3.0	Decachlorobiphenyl	66	32-156
			Tetrachloro-m-xylene	79	67-119
TNSOIL2*112	SB-34-008B DUP	1.5	Decachlorobiphenyl	49	32-156
			Tetrachloro-m-xylene	72	67-119
TNSOIL2*113	SB-34-009A DUP	0.0	Decachlorobiphenyl	61	32-156
			Tetrachloro-m-xylene	82	67-119
TNSOIL2*115	SB-34-001A DUP	0.0	Decachlorobiphenyl	58	32-156
			Tetrachloro-m-xylene	72	67-119
	Addendum Samples				
TNSOIL2*320	SB-45-002A	8.0	Decachlorobiphenyl	102	32-156
			Tetrachloro-m-xylene	82	67-119
TNSOIL2*321	SB-45-002B	12.0	Decachlorobiphenyl	109	32-156
			Tetrachloro-m-xylene	91	67-119
TNSOIL2*322	SB-45-003A	8.0	Decachlorobiphenyl	97	32-156
			Tetrachloro-m-xylene	75	67-119
TNSOIL2*323	SB-45-003B	10.0	Decachlorobiphenyl	128	32-156
			Tetrachloro-m-xylene	93	67-119

ATTACHMENT E-7a

SURROGATE RECOVERIES FOR SOIL SAMPLES
(Page 16 of 18)

Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*324	SB-45-004A	6.5	Decachlorobiphenyl	88	32-156
			Tetrachloro-m-xylene	79	67-119
TNSOIL2*325	SB-45-004B	9.0	Decachlorobiphenyl	72	32-156
			Tetrachloro-m-xylene	72	67-119
TNSOIL2*326	SB-45-005A	12.0	Decachlorobiphenyl	113	32-156
			Tetrachloro-m-xylene	90	67-119
TNSOIL2*328	SB-45-006A	10.0	Decachlorobiphenyl	112	32-156
			Tetrachloro-m-xylene	90	67-119
TNSOIL2*329	SB-45-006B	11.5	Decachlorobiphenyl	103	32-156
			Tetrachloro-m-xylene	88	67-119
TNSOIL2*330	SB-45-007A	10.5	Decachlorobiphenyl	124	32-156
			Tetrachloro-m-xylene	102	67-119
TNSOIL2*331	SB-45-007B	12.0	Decachlorobiphenyl	94	32-156
			Tetrachloro-m-xylene	78	67-119
TNSOIL2*332	SB-45-008A	7.0	Decachlorobiphenyl	133	32-156
			Tetrachloro-m-xylene	103	67-119
TNSOIL2*333	SB-45-008B	10.0	Decachlorobiphenyl	103	32-156
			Tetrachloro-m-xylene	87	67-119
TNSOIL2*334	SB-45-009A	8.0	Decachlorobiphenyl	100	32-156
			Tetrachloro-m-xylene	85	67-119
TNSOIL2*335	SB-45-009B	11.0	Decachlorobiphenyl	99	32-156
			Tetrachloro-m-xylene	76	67-119
TNSOIL2*336	SB-45-010A	7.0	Decachlorobiphenyl	78	32-156
			Tetrachloro-m-xylene	73	67-119
TNSOIL2*338	SB-45-011A	9.0	Decachlorobiphenyl	84	32-156
			Tetrachloro-m-xylene	78	67-119
TNSOIL2*339	SB-45-011B	10.5	Decachlorobiphenyl	94	32-156
			Tetrachloro-m-xylene	88	67-119
TNSOIL2*340	SB-45-012A	8.5	Decachlorobiphenyl	96	32-156
			Tetrachloro-m-xylene	84	67-119
TNSOIL2*341	SB-45-012B	10.5	Decachlorobiphenyl	97	32-156
			Tetrachloro-m-xylene	87	67-119
TNSOIL2*342	SB-45-013A	7.0	Decachlorobiphenyl	82	32-156
			Tetrachloro-m-xylene	88	67-119
TNSOIL2*343	SB-45-013B	9.0	Decachlorobiphenyl	105	32-156
			Tetrachloro-m-xylene	94	67-119
TNSOIL2*344	SB-45-014A	9.0	Decachlorobiphenyl	70	32-156
			Tetrachloro-m-xylene	91	67-119

ATTACHMENT E-7a

SURROGATE RECOVERIES FOR SOIL SAMPLES

Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*345	SB-45-014B	10.5	Decachlorobiphenyl	102	32-156
			Tetrachloro-m-xylene	94	67-119
TNSOIL2*346	SB-45-015A	8.0	Decachlorobiphenyl	113	32-156
			Tetrachloro-m-xylene	99	67-119
TNSOIL2*360	SB-45-007B DUP	12.0	Decachlorobiphenyl	99	32-156
			Tetrachloro-m-xylene	84	67-119
TNSOIL2*361	SB-45-008A DUP	7.0	Decachlorobiphenyl	110	32-156
			Tetrachloro-m-xylene	96	67-119
TNSOIL2*362	SB-48-001A DUP	4.0	Decachlorobiphenyl	36	32-156
			Tetrachloro-m-xylene	81	67-119
TNSOIL2*363	SB-45-013A DUP	7.0	Decachlorobiphenyl	64	32-156
			Tetrachloro-m-xylene	94	67-119
TNSOIL2*365	SB-48-001A	4.0	Decachlorobiphenyl	34	32-156
			Tetrachloro-m-xylene	72	67-119
TNSOIL2*367	SB-48-002A	3.5	Decachlorobiphenyl	64	32-156
			Tetrachloro-m-xylene	94	67-119
TNSOIL2*368	SB-48-002B	10.0	Decachlorobiphenyl	76	32-156
			Tetrachloro-m-xylene	78	67-119
TNSOIL2*385	SB-48-001B	9.5	Decachlorobiphenyl	108	32-156
			Tetrachloro-m-xylene	99	67-119
TPH as gas and diesel					
TNSOIL2*109	SB-34-012A	0.0	Pentacosane	93	50-152
TNSOIL2*110	SB-34-012B	1.5	Pentacosane	104	50-152
TNSOIL2*111	SB-34-012C	3.0	Pentacosane	84	50-152
TNSOIL2*114	SB-34-012B DUP	1.5	Pentacosane	95	50-152
	Addendum Samples				
TNSOIL2*320	SB-45-002A	8.0	Pentacosane	109	50-152
TNSOIL2*321	SB-45-002B	12.0	Pentacosane	105	50-152
TNSOIL2*322	SB-45-003A	8.0	Pentacosane	100	50-152
TNSOIL2*323	SB-45-003B	10.0	Pentacosane	103	50-152
TNSOIL2*324	SB-45-004A	6.5	Pentacosane	79	50-152
TNSOIL2*325	SB-45-004B	9.0	Pentacosane	95	50-152
TNSOIL2*326	SB-45-005A	12.0	Pentacosane	102	50-152
TNSOIL2*328	SB-45-006A	10.0	Pentacosane	103	50-152

ATTACHMENT E-7a

SURROGATE RECOVERIES FOR SOIL SAMPLES

Laboratory Identification	Sample Identification	Depth (feet)	Spiking Compound	Recovery (%)	Control Limits (%)
TNSOIL2*329	SB-45-006B	11.5	Pentacosane	103	50-152
TNSOIL2*330	SB-45-007A	10.5	Pentacosane	96	50-152
TNSOIL2*331	SB-45-007B	12.0	Pentacosane	115	50-152
TNSOIL2*332	SB-45-008A	7.0	Pentacosane	90	50-152
TNSOIL2*333	SB-45-008B	10.0	Pentacosane	100	50-152
TNSOIL2*334	SB-45-009A	8.0	Pentacosane	103	50-152
TNSOIL2*335	SB-45-009B	11.0	Pentacosane	100	50-152
TNSOIL2*336	SB-45-010A	7.0	Pentacosane	92	50-152
TNSOIL2*338	SB-45-011A	9.0	Pentacosane	76	50-152
TNSOIL2*339	SB-45-011B	10.5	Pentacosane	81	50-152
TNSOIL2*340	SB-45-012A	8.5	Pentacosane	108	50-152
TNSOIL2*341	SB-45-012B	10.5	Pentacosane	106	50-152
TNSOIL2*342	SB-45-013A	7.0	Pentacosane	106	50-152
TNSOIL2*343	SB-45-013B	9.0	Pentacosane	111	50-152
TNSOIL2*344	SB-45-014A	9.0	Pentacosane	113	50-152
TNSOIL2*345	SB-45-014B	10.5	Pentacosane	115	50-152
TNSOIL2*346	SB-45-015A	8.0	Pentacosane	102	50-152
TNSOIL2*360	SB-45-007B DUP	12.0	Pentacosane	100	50-152
TNSOIL2*361	SB-45-008A DUP	7.0	Pentacosane	104	50-152
TNSOIL2*362	SB-48-001A DUP	4.0	Pentacosane	107	50-152
TNSOIL2*363	SB-45-013A DUP	7.0	Pentacosane	105	50-152
TNSOIL2*365	SB-48-001A	4.0	Pentacosane	80	50-152
TNSOIL2*367	SB-48-002A	3.5	Pentacosane	89	50-152
TNSOIL2*368	SB-48-002B	10.0	Pentacosane	93	50-152
TNSOIL2*385	SB-48-001B	9.5	Pentacosane	111	50-152

OC Organochlorine
PCBs Polychlorinated biphenyls
TPH Total petroleum hydrocarbons
Shading denotes recoveries outside the established control limits.

ATTACHMENT E-7b

SURROGATE RECOVERIES FOR WATER SAMPLES
(Page 1 of 7)

Laboratory Identification	Sample Identification	Spiking Compound	Recovery (%)	Control Limits (%)
Volatile Organic Compounds				
TNWTR2*1	WW-3	4-Bromofluorobenzene	98	86-115
		1,2-Dichloroethane-D4	92	76-114
		Toluene-D8	98	88-110
TNWTR2*2	WW-3 DUP	4-Bromofluorobenzene	96	86-115
		1,2-Dichloroethane-D4	92	76-114
		Toluene-D8	98	88-110
TNWTR2*3	TRPBLK	4-Bromofluorobenzene	98	86-115
		1,2-Dichloroethane-D4	92	76-114
		Toluene-D8	98	88-110
TNWTR2*22	TNEQB-12	4-Bromofluorobenzene	100	86-115
		1,2-Dichloroethane-D4	98	76-114
		Toluene-D8	98	88-110
TNWTR2*23	N-142-93	4-Bromofluorobenzene	102	86-115
		1,2-Dichloroethane-D4	98	76-114
		Toluene-D8	100	88-110
TNWTR2*24	TNEQB-13	4-Bromofluorobenzene	102	86-115
		1,2-Dichloroethane-D4	102	76-114
		Toluene-D8	102	88-110
TNWTR2*26	N-143-93	4-Bromofluorobenzene	100	86-115
		1,2-Dichloroethane-D4	100	76-114
		Toluene-D8	102	88-110
TNWTR2*27	T-7	4-Bromofluorobenzene	102	86-115
		1,2-Dichloroethane-D4	102	76-114
		Toluene-D8	100	88-110
TNWTR2*30	TRIP-MS	4-Bromofluorobenzene	104	86-115
		1,2-Dichloroethane-D4	100	76-114
		Toluene-D8	104	88-110
TNWTR2*35	TRIP-MS	4-Bromofluorobenzene	104	86-115
		1,2-Dichloroethane-D4	102	76-114
		Toluene-D8	100	88-110

ATTACHMENT E-7b

SURROGATE RECOVERIES FOR WATER SAMPLES
(Page 2 of 7)

Laboratory Identification	Sample Identification	Spiking Compound	Recovery (%)	Control Limits (%)
TNWTR2*36	TRPBLK	4-Bromofluorobenzene	102	86-115
		1,2-Dichloroethane-D4	98	76-114
		Toluene-D8	96	88-110
TNWTR2*58	TRIP-GC3	4-Bromofluorobenzene	100	86-115
		1,2-Dichloroethane-D4	102	76-114
		Toluene-D8	102	88-110
TNWTR2*70	N-142-93	4-Bromofluorobenzene	100	86-115
		1,2-Dichloroethane-D4	96	76-114
		Toluene-D8	96	88-110
TNWTR2*72	N-143-93	4-Bromofluorobenzene	106	86-115
		1,2-Dichloroethane-D4	110	76-114
		Toluene-D8	98	88-110
TNWTR2*74	T-7	4-Bromofluorobenzene	106	86-115
		1,2-Dichloroethane-D4	112	76-114
		Toluene-D8	100	88-110
TNWTR2*76	N-142-93 DUP	4-Bromofluorobenzene	108	86-115
		1,2-Dichloroethane-D4	112	76-114
		Toluene-D8	100	88-110
Semivolatile Organic Compounds				
TNWTR2*1	WW-3	2-Fluorophenol	67	21-100
		Phenol-D5	48	10-94
		Nitrobenzene-D5	70	35-114
		2-Fluorobiphenyl	88	43-116
		2,4,6-Tribromophenol	72	10-123
		Terphenyl-D14	90	33-141
TNWTR2*2	WW-3 DUP	2-Fluorophenol	59	21-100
		Phenol-D5	42	10-94
		Nitrobenzene-D5	66	35-114
		2-Fluorobiphenyl	88	43-116
		2,4,6-Tribromophenol	74	10-123
		Terphenyl-D14	92	33-141

ATTACHMENT E-7b

SURROGATE RECOVERIES FOR WATER SAMPLES
(Page 3 of 7)

Laboratory Identification	Sample Identification	Spiking Compound	Recovery (%)	Control Limits (%)
TNWTR2*16	WW-36	2-Fluorophenol	53	21-100
		Phenol-D5	39	10-94
		Nitrobenzene-D5	60	35-114
		2-Fluorobiphenyl	58	43-116
		2,4,6-Tribromophenol	54	10-123
		Terphenyl-D14	72	33-141
TNWTR2*22	TNEQB-12	2-Fluorophenol	55	21-100
		Phenol-D5	38	10-94
		Nitrobenzene-D5	58	35-114
		2-Fluorobiphenyl	62	43-116
		2,4,6-Tribromophenol	80	10-123
		Terphenyl-D14	88	33-141
TNWTR2*23	N-142-93	2-Fluorophenol	65	21-100
		Phenol-D5	49	10-94
		Nitrobenzene-D5	76	35-114
		2-Fluorobiphenyl	70	43-116
		2,4,6-Tribromophenol	92	10-123
		Terphenyl-D14	104	33-141
TNWTR2*24	TNEQB-13	2-Fluorophenol	62	21-100
		Phenol-D5	46	10-94
		Nitrobenzene-D5	74	35-114
		2-Fluorobiphenyl	68	43-116
		2,4,6-Tribromophenol	91	10-123
		Terphenyl-D14	82	33-141
TNWTR2*26	N-143-93	2-Fluorophenol	62	21-100
		Phenol-D5	45	10-94
		Nitrobenzene-D5	76	35-114
		2-Fluorobiphenyl	68	43-116
		2,4,6-Tribromophenol	90	10-123
		Terphenyl-D14	96	33-141
TNWTR2*27	T-7	2-Fluorophenol	62	21-100
		Phenol-D5	45	10-94
		Nitrobenzene-D5	72	35-114
		2-Fluorobiphenyl	66	43-116
		2,4,6-Tribromophenol	82	10-123
		Terphenyl-D14	94	33-141

ATTACHMENT E-7b

SURROGATE RECOVERIES FOR WATER SAMPLES
(Page 4 of 7)

Laboratory Identification		Sample Identification	Spiking Compound	Recovery (%)	Control Limits (%)
TNWTR2*70		N-142-93	2-Fluorophenol	52	21-100
			Phenol-D5	38	10-94
			Nitrobenzene-D5	62	35-114
			2-Fluorobiphenyl	60	43-116
			2,4,6-Tribromophenol	61	10-123
			Terphenyl-D14	70	33-141
TNWTR2*72		N-143-93	2-Fluorophenol	53	21-100
			Phenol-D5	43	10-94
			Nitrobenzene-D5	58	35-114
			2-Fluorobiphenyl	58	43-116
			2,4,6-Tribromophenol	60	10-123
			Terphenyl-D14	66	33-141
TNWTR2*74		T-7	2-Fluorophenol	56	21-100
			Phenol-D5	44	10-94
			Nitrobenzene-D5	62	35-114
			2-Fluorobiphenyl	58	43-116
			2,4,6-Tribromophenol	57	10-123
			Terphenyl-D14	82	33-141
TNWTR2*76		N-142-93 DUP	2-Fluorophenol	55	21-100
			Phenol-D5	49	10-94
			Nitrobenzene-D5	62	35-114
			2-Fluorobiphenyl	56	43-116
			2,4,6-Tribromophenol	60	10-123
			Terphenyl-D14	86	33-141
OC Pesticides/PCBs					
TNWTR2*1	A	WW-3	Decachlorobiphenyl	87	46-140
	B		Decachlorobiphenyl	68	46-140
			Tetrachloro-m-xylene	65	23-109
TNWTR2*2	A	WW-3 DUP	Decachlorobiphenyl	82	46-140
	B		Decachlorobiphenyl	62	46-140
			Tetrachloro-m-xylene	66	23-109
TNWTR2*15		TNEQB-5	Decachlorobiphenyl	82	46-140
			Tetrachloro-m-xylene	76	23-109
TNWTR2*23		N-142-93	Decachlorobiphenyl	78	46-140
			Tetrachloro-m-xylene	55	23-109
TNWTR2*24		TNEQB-13	Decachlorobiphenyl	68	46-140
			Tetrachloro-m-xylene	48	23-109

ATTACHMENT E-7b

SURROGATE RECOVERIES FOR WATER SAMPLES
(Page 5 of 7)

Laboratory Identification	Sample Identification	Spiking Compound	Recovery (%)	Control Limits (%)
TNWTR2*26	N-143-93	Decachlorobiphenyl	73	46-140
		Tetrachloro-m-xylene	49	23-109
TNWTR2*27	T-7	Decachlorobiphenyl	75	46-140
		Tetrachloro-m-xylene	44	23-109
TNWTR2*70	N-142-93	Decachlorobiphenyl	65	46-140
		Tetrachloro-m-xylene	75	23-109
TNWTR2*72	N-143-93	Decachlorobiphenyl	59	46-140
		Tetrachloro-m-xylene	68	23-109
TNWTR2*74	T-7	Decachlorobiphenyl	61	46-140
		Tetrachloro-m-xylene	64	23-109
TNWTR2*76	N-142-93 DUP	Decachlorobiphenyl	64	46-140
		Tetrachloro-m-xylene	53	23-109
Explosives				
TNWTR2*1	WW-3	3,4-Dinitrotoluene	99	67-133
TNWTR2*2	WW-3 DUP	3,4-Dinitrotoluene	95	67-133
TNWTR2*12	SW-21-001	3,4-Dinitrotoluene	95	67-133
TNWTR2*21	TNEQB-11	3,4-Dinitrotoluene	93	67-133
TNWTR2*11	TNEQB-2	3,4-Dinitrotoluene	90	67-133
TNWTR2*20	TNEQB-10	3,4-Dinitrotoluene	86	67-133
TNWTR2*23	N-142-93	3,4-Dinitrotoluene	93	67-133
TNWTR2*24	TNEQB-13	3,4-Dinitrotoluene	97	67-133
TNWTR2*26	N-143-93	3,4-Dinitrotoluene	94	67-133
TNWTR2*27	T-7	3,4-Dinitrotoluene	99	67-133
TNWTR2*70	N-142-93	3,4-Dinitrotoluene	95	67-133
TNWTR2*72	N-143-93	3,4-Dinitrotoluene	99	67-133
TNWTR2*74	T-7	3,4-Dinitrotoluene	75	67-133

ATTACHMENT E-7b

SURROGATE RECOVERIES FOR WATER SAMPLES
(Page 6 of 7)

Laboratory Identification	Sample Identification	Spiking Compound	Recovery (%)	Control Limits (%)
TNWTR2*76	N-142-93 DUP	3,4-Dinitrotoluene	95	67-133
TPH as gas and diesel				
TNWTR2*14	WW-34	Pentacosane	113	75-125
ADDENDUM SAMPLES				
Volatile Organic Compounds				
TNWTR2*91	TNEQB-13	4-Bromofluorobenzene	96	86-115
		1,2-Dichloroethane-D4	96	76-114
		Toluene-D8	98	88-110
TNWTR2*79	TNEQB-14	4-Bromofluorobenzene	100	86-115
		1,2-Dichloroethane-D4	94	76-114
		Toluene-D8	102	88-110
TNWTR2*80	TNEQB-15	4-Bromofluorobenzene	98	86-115
		1,2-Dichloroethane-D4	96	76-114
		Toluene-D8	100	88-110
TNWTR2*92	TNEQB-17	4-Bromofluorobenzene	96	86-115
		1,2-Dichloroethane-D4	98	76-114
		Toluene-D8	100	88-110
TNWTR2*82	TRIP-1	4-Bromofluorobenzene	100	86-115
		1,2-Dichloroethane-D4	98	76-114
		Toluene-D8	102	88-110
TNWTR2*83	TRIP-2	4-Bromofluorobenzene	100	86-115
		1,2-Dichloroethane-D4	98	76-114
		Toluene-D8	102	88-110
TNWTR2*84	TRIP-3	4-Bromofluorobenzene	100	86-115
		1,2-Dichloroethane-D4	98	76-114
		Toluene-D8	102	88-110
TNWTR2*85	TRIP-4	4-Bromofluorobenzene	98	86-115
		1,2-Dichloroethane-D4	96	76-114
		Toluene-D8	100	88-110
TNWTR2*93	TRIP-6	4-Bromofluorobenzene	96	86-115
		1,2-Dichloroethane-D4	98	76-114
		Toluene-D8	100	88-110

ATTACHMENT E-7b

SURROGATE RECOVERIES FOR WATER SAMPLES
(Page 7 of 7)

Laboratory Identification	Sample Identification	Spiking Compound	Recovery (%)	Control Limits (%)
Semivolatile Organic Compounds				
TNWTR2*91	TNEQB-13	2-Fluorophenol	61	21-100
		Phenol-D5	51	10-94
		Nitrobenzene-D5	72	35-114
		2-Fluorobiphenyl	84	43-116
		2,4,6-Tribromophenol	85	10-123
		Terphenyl-D14	104	33-141
TNWTR2*79	TNEQB-14	2-Fluorophenol	93	21-100
		Phenol-D5	67	10-94
		Nitrobenzene-D5	92	35-114
		2-Fluorobiphenyl	82	43-116
		2,4,6-Tribromophenol	59	10-123
		Terphenyl-D14	84	33-141
TNWTR2*80	TNEQB-15	2-Fluorophenol	66	21-100
		Phenol-D5	52	10-94
		Nitrobenzene-D5	72	35-114
		2-Fluorobiphenyl	90	43-116
		2,4,6-Tribromophenol	94	10-123
		Terphenyl-D14	98	33-141
TNWTR2*81	TNEQB-16	2-Fluorophenol	71	21-100
		Phenol-D5	52	10-94
		Nitrobenzene-D5	70	35-114
		2-Fluorobiphenyl	52	43-116
		2,4,6-Tribromophenol	80	10-123
		Terphenyl-D14	98	33-141

OC Organochlorine
PCBs Polychlorinated biphenyls
TPH Total petroleum hydrocarbons

ATTACHMENT E-7c

INTERNAL STANDARD RECOVERIES FOR DIOXINS/FURANS IN SOIL SAMPLES
(Page 1 of 2)

Laboratory Identification	Sample Identification	Depth (feet)	Internal Standard Compound	Recovery (%)	Control Limits (%)
TNSOIL2*129	SB-37-001A	0.0	13C-2,3,7,8,-TCDD	92	40-120
TNSOIL2*130	SB-37-001B	1.5	13C-2,3,7,8,-TCDD	89	40-120
TNSOIL2*131	SB-37-001C	3.0	13C-2,3,7,8,-TCDD	87	40-120
TNSOIL2*132	SB-37-002A	0.0	13C-2,3,7,8,-TCDD	82	40-120
TNSOIL2*133	SB-37-002B	1.5	13C-2,3,7,8,-TCDD	95	40-120
TNSOIL2*134	SB-37-002C	3.0	13C-2,3,7,8,-TCDD	91	40-120
TNSOIL2*135	SB-37-003A	0.0	13C-2,3,7,8,-TCDD	82	40-120
TNSOIL2*136	SB-37-003B	1.5	13C-2,3,7,8,-TCDD	90	40-120
TNSOIL2*137	SB-37-003C	3.0	13C-2,3,7,8,-TCDD	89	40-120
TNSOIL2*138	SB-37-004A	0.0	13C-2,3,7,8,-TCDD	81	40-120
TNSOIL2*139	SB-37-004B	1.5	13C-2,3,7,8,-TCDD	81	40-120
TNSOIL2*140	SB-37-004C	3.0	13C-2,3,7,8,-TCDD	86	40-120
TNSOIL2*141	SB-37-005A	0.0	13C-2,3,7,8,-TCDD	103	40-120
TNSOIL2*142	SB-37-005B	1.5	13C-2,3,7,8,-TCDD	85	40-120
TNSOIL2*143	SB-37-005C	3.0	13C-2,3,7,8,-TCDD	89	40-120
TNSOIL2*144	SB-37-006A	0.0	13C-2,3,7,8,-TCDD	79	40-120
TNSOIL2*151	SB-37-006A DUP	0.0	13C-2,3,7,8,-TCDD	69	40-120
TNSOIL2*145	SB-37-006B	1.5	13C-2,3,7,8,-TCDD	96	40-120
TNSOIL2*146	SB-37-006C	3.0	13C-2,3,7,8,-TCDD	99	40-120
TNSOIL2*152	SB-37-006C DUP	3.0	13C-2,3,7,8,-TCDD	68	40-120
TNSOIL2*287	SB-37-007A	0.0	13C-2,3,7,8,-TCDD	58	40-120
TNSOIL2*288	SB-37-007B	1.5	13C-2,3,7,8,-TCDD	74	40-120
TNSOIL2*289	SB-37-007C	3.0	13C-2,3,7,8,-TCDD	82	40-120

ATTACHMENT E-7c

INTERNAL STANDARD RECOVERIES FOR DIOXINS/FURANS IN SOIL SAMPLES
(Page 2 of 2)

Laboratory Identification	Sample Identification	Depth (feet)	Internal Standard Compound	Recovery (%)	Control Limits (%)
TNSOIL2*68	SD-21-001	0.0	13C-2,3,7,8,-TCDD	94	40-120
TNSOIL2*69	SD-21-002	0.0	13C-2,3,7,8,-TCDD	66	40-120
TNSOIL2*120	SS-37-013	0.0	13C-2,3,7,8,-TCDD	94	40-120
TNSOIL2*121	SS-37-014	0.0	13C-2,3,7,8,-TCDD	88	40-120
TNSOIL2*122	SS-37-015	0.0	13C-2,3,7,8,-TCDD	88	40-120
TNSOIL2*123	SS-37-016	0.0	13C-2,3,7,8,-TCDD	88	40-120
TNSOIL2*124	SS-37-017	0.0	13C-2,3,7,8,-TCDD	86	40-120
TNSOIL2*125	SS-37-018	0.0	13C-2,3,7,8,-TCDD	97	40-120
TNSOIL2*126	SS-37-019	0.0	13C-2,3,7,8,-TCDD	93	40-120
TNSOIL2*127	SS-37-020	0.0	13C-2,3,7,8,-TCDD	98	40-120
TNSOIL2*128	SS-37-021	0.0	13C-2,3,7,8,-TCDD	101	40-120
Addendum Samples					
TNSOIL2*315	SB-42-050A	0.5	13C-2,3,7,8,-TCDD	85	40-120
TNSOIL2*316	SB-42-050B	1.0	13C-2,3,7,8,-TCDD	82	40-120
TNSOIL2*317	SB-42-051A	0.5	13C-2,3,7,8,-TCDD	83	40-120
TNSOIL2*318	SB-42-051B	2.0	13C-2,3,7,8,-TCDD	79	40-120
TNSOIL2*319	SB-42-050A	0.5	13C-2,3,7,8,-TCDD	80	40-120

ATTACHMENT E-7d

INTERNAL STANDARD RECOVERIES FOR WATER SAMPLES
(Page 1 of 1)

Laboratory Identification	Sample Identification	Internal Standard Compound	Recovery (%)	Control Limits (%)
TNWTR2*16	TNEQB-6	13C-2,3,7,8,-TCDD	66	40-120
TNWTR2*12	SW-21-0001	13C-2,3,7,8,-TCDD	50	40-120

ATTACHMENT E-8

METHOD BLANK RESULTS

ATTACHMENT E-8a

CONTAMINATED SOIL METHOD BLANK SAMPLES AND ASSOCIATED FIELD SAMPLES

Lot	Compound	Method	Concentration (µg/g)	Samples Affected	Depth (feet)	Concentration (µg/g)
Volatile Organic Compounds						
IUMA	Carbon disulfide	LM19	0.001	None	--	--
	Methylene chloride	LM19	0.002	None	--	--
	Addendum Samples					
YGIB	Acetone	LM19	0.008	None	--	--
	Methylene Chloride	LM19	0.004	None	--	--
	Trichlorofluoromethane	LM19	0.010	SB-45-002A	8.0	0.012
				SB-45-003A	8.0	0.0059
				SB-45-007B	12.0	0.0055
				SB-45-009A	8.0	0.0055
YGJB	Acetone	LM19	0.003	None	--	--
YGKB	Acetone	LM19	0.008	SB-42-050B	1.0	0.029
				SB-48-002A	3.5	0.049
YGLB	Methylene Chloride	LM19	0.005	SB-48-001A	4.0	0.021
	1,1,2,2-Tetrachloroethene	LM19	0.0006	None	--	--
YGMB	Acetone	LM19	0.009	None	--	--
	Methylene Chloride	LM19	0.001	None	--	--
	Trichlorofluoromethane	LM19	0.019	SB-45-013A	7.0	0.0061
				SB-45-013B	9.0	0.0084
				SB-45-014A	8.5	0.016
				SB-45-012A DUP	8.5	0.0055
				SB-48-001B	9.5	0.015

ATTACHMENT E-8a

CONTAMINATED SOIL METHOD BLANK SAMPLES
AND ASSOCIATED FIELD SAMPLES

Lot	Compound	Method	Concentration (µg/g)	Samples Affected	Depth (feet)	Concentration (µg/g)
Semivolatile Organic Compounds						
HZZA	Di-n-butylphthalate	LM18	0.12	SS-37-014	0.0	0.58
				SS-37-015	0.0	0.10
				SS-37-016	0.0	0.86
				SS-37-017	0.0	0.95
				SS-37-018	0.0	0.22
				SS-37-019	0.0	0.37
				SS-37-020	0.0	0.21
				SS-37-014 DUP	0.0	0.29
				SB-37-001A	0.0	0.35
				SB-37-001B	1.5	0.38
				SB-37-001C	3.0	0.25
				SB-37-002A	0.0	0.10
				SB-37-002B	1.5	0.38
				SB-37-002C	3.0	0.43
				SB-37-003A	0.0	0.43
				SB-37-003B	1.5	0.10
IVLA	Bis(2-ethylhexyl)phthalate	LM18	0.32	None	--	--
IVWA	Diethylphthalate	LM18	0.06	None	--	--
OEEA	DEP	LM18	0.25	None	--	--
	Addendum Samples					
OEKB	Bis(2-ethylhexyl)phthalate	LM18	0.11	None	--	--
	Di-n-butylphthalate	LM18	0.03	SB-45-003A	8.0	0.07
OELB	Bis(2-ethylhexyl)phthalate	LM18	0.08	None	--	--

ATTACHMENT E-8a

CONTAMINATED SOIL METHOD BLANK SAMPLES AND ASSOCIATED FIELD SAMPLES

Lot	Compound	Method	Concentration (µg/g)	Samples Affected	Depth (feet)	Concentration (µg/g)
OEMB	Bis(2-ethylhexyl)phthalate	LM18	0.04	None	--	--
	Di-n-butylphthalate	LM18	0.02	SB-45-011B	10.5	0.09
				SB-45-007B DUP	12.0	0.09
OEOB	Bis(2-ethylhexyl)phthalate	LM18	0.14	None	--	--
OEPB	Bis(2-ethylhexyl)phthalate	LM18	0.04	None	--	--
Organochlorine Pesticides						
IAIA	alpha-Chlordane	LH10	0.001	None	--	--
	gamma-Chlordane (Lindane)	LH10	0.003	None	--	--
	Addendum Samples					
UFQA	Aldrin	LH10	0.002	None	--	--
	Dieldrin	LH10	0.001	None	--	--
	Endosufan A	LH10	0.0006	None	--	--
	Endrin	LH10	0.0004	None	--	--
	Heptachlor	LH10	0.003	None	--	--
UFSA	Aldrin	LH10	0.001	None	--	--
	Dieldrin	LH10	0.002	None	--	--
	Heptachlor	LH10	0.0008	None	--	--
UFTA	Aldrin	LH10	0.0008	None	--	--
	Dieldrin	LH10	0.001	None	--	--
	Endrin	LH10	0.0007	None	--	--
	Heptachlor	LH10	0.0004	None	--	--
UFUA	Dieldrin	LH10	0.001	None	--	--

ATTACHMENT E-8a

CONTAMINATED SOIL METHOD BLANK SAMPLES AND ASSOCIATED FIELD SAMPLES

Lot	Compound	Method	Concentration (µg/g)	Samples Affected	Depth (feet)	Concentration (µg/g)
Explosives						
NCBA	1,3-Dinitrobenzene	LW12	0.081	None	--	--
Metals						
ISGA	Arsenic	JD19	0.327	SB-42-040A	0.0	1.46
HWKA	Aluminum	JS16	503	None*	--	--
	Barium	JS16	8.91	None*	--	--
	Calcium	JS16	765	None*	--	--
	Iron	JS16	860	None*	--	--
	Potassium	JS16	146	None*	--	--
	Magnesium	JS16	254	None*	--	--
	Manganese	JS16	21.7	None*	--	--
	Sodium	JS16	225	None*	--	--
HWRA	Aluminum	JS16	415	None*	--	--
	Barium	JS16	6.51	None*	--	--
	Calcium	JS16	659	None*	--	--
	Iron	JS16	584	None*	--	--
	Potassium	JS16	161	None*	--	--
	Magnesium	JS16	211	None*	--	--
	Manganese	JS16	13.2	None*	--	--
	Sodium	JS16	279	None*	--	--
HWSA	Aluminum	JS16	960	None*	--	--
	Barium	JS16	11.8	None*	--	--
	Calcium	JS16	936	None*	--	--
	Iron	JS16	1240	None*	--	--
	Potassium	JS16	230	None*	--	--

ATTACHMENT E-8a

CONTAMINATED SOIL METHOD BLANK SAMPLES AND ASSOCIATED FIELD SAMPLES
(Page 5 of 11)

Lot	Compound	Method	Concentration (µg/g)	Samples Affected	Depth (feet)	Concentration (µg/g)
	Magnesium	JS16	328	None*	--	--
HWSA	Manganese	JS16	22.3	None*	--	--
(con't)	Sodium	JS16	377	None*	--	--
HWTA	Aluminum	JS16	463	None*	--	--
	Barium	JS16	9.38	None*	--	--
	Calcium	JS16	837	None*	--	--
	Iron	JS16	601	None*	--	--
	Potassium	JS16	141	None*	--	--
	Magnesium	JS16	260	None*	--	--
	Manganese	JS16	16	None*	--	--
	Sodium	JS16	282	None*	--	--
UBAA	Aluminum	JS16	432	None*	--	--
	Barium	JS16	7.9	None*	--	--
	Calcium	JS16	796	None*	--	--
	Iron	JS16	679	None*	--	--
	Potassium	JS16	136	None*	--	--
	Magnesium	JS16	241	None*	--	--
	Manganese	JS16	17	None*	--	--
	Sodium	JS16	251	None*	--	--
UBGA	Aluminum	JS16	573	None*	--	--
	Barium	JS16	8.47	None*	--	--
	Calcium	JS16	844	None*	--	--
	Iron	JS16	806	None*	--	--
	Potassium	JS16	157	None*	--	--
	Magnesium	JS16	274	None*	--	--
	Manganese	JS16	16	None*	--	--
	Sodium	JS16	292	None*	--	--

ATTACHMENT E-8a

CONTAMINATED SOIL METHOD BLANK SAMPLES
AND ASSOCIATED FIELD SAMPLES

Lot	Compound	Method	Concentration (µg/g)	Samples Affected	Depth (feet)	Concentration (µg/g)

ATTACHMENT E-8a

CONTAMINATED SOIL METHOD BLANK SAMPLES
AND ASSOCIATED FIELD SAMPLES
(Page 7 of 11)

Lot	Compound	Method	Concentration (µg/g)	Samples Affected	Depth (feet)	Concentration (µg/g)
UBIA	Aluminum	JS16	418	None*	--	--
	Barium	JS16	7.56	None*	--	--
	Calcium	JS16	790	None*	--	--
	Iron	JS16	690	None*	--	--
	Potassium	JS16	164	None*	--	--
	Magnesium	JS16	231	None*	--	--
	Manganese	JS16	17.2	None*	--	--
	Sodium	JS16	228	None*	--	--
UBJA	Aluminum	JS16	398	None*	--	--
	Barium	JS16	8.08	None*	--	--
	Calcium	JS16	847	None*	--	--
	Iron	JS16	728	None*	--	--
	Potassium	JS16	106	None*	--	--
	Magnesium	JS16	221	None*	--	--
	Manganese	JS16	18.3	None*	--	--
	Sodium	JS16	214	None*	--	--
UBKA	Aluminum	JS16	406	None*	--	--
	Barium	JS16	8.43	None*	--	--
	Calcium	JS16	883	None*	--	--
	Iron	JS16	757	None*	--	--
	Potassium	JS16	100	None*	--	--
	Magnesium	JS16	225	None*	--	--
	Manganese	JS16	19	None*	--	--
	Sodium	JS16	216	None*	--	--
	Addendum Samples					
UBVB	Aluminum	JS16	271	None*	--	--

ATTACHMENT E-8a

CONTAMINATED SOIL METHOD BLANK SAMPLES
AND ASSOCIATED FIELD SAMPLES
(Page 8 of 11)

Lot	Compound	Method	Concentration (µg/g)	Samples Affected	Depth (feet)	Concentration (µg/g)
UBVB (con't)	Barium	JS16	6.5	None*	--	--
	Calcium	JS16	382	None*	--	--
	Iron	JS16	548	None*	--	--
	Potassium	JS16	102	None*	--	--
	Magnesium	JS16	107	None*	--	--
	Manganese	JS16	25.9	None*	--	--
	Sodium	JS16	319	None*	--	--
	Copper	JS16	0.693	EP-42-002B	6.0	2.09
				SB-45-002B	12.0	1.88
				SB-45-003A	8.0	3.15
				SB-45-004A	6.5	2.80
				SB-45-004B	9.0	3.11
				SB-45-006A	10.0	3.38
				SB-45-006B	11.5	1.97
				SB-45-008A	7.0	2.45
				SB-45-008A DUP	7.0	2.32
				SB-45-008B	10.0	2.15
				SB-45-009A	8.0	1.97
				SB-45-009B	11.0	3.08
	Nickel	JS16	0.699	EP-42-002B	6.0	2.76
				SB-45-006B	11.5	2.35
				SB-45-008B	10.0	3.28
				SB-45-009A	8.0	3.43
				SB-45-009B	11.0	3.32
	Zinc	JS16	1.94	EP-42-002B	6.0	7.50
				SB-45-002B	12.0	7.81
				SB-45-005A	12.0	8.09
				SB-45-006A	10.0	8.83
				SB-45-006B	11.5	6.90
				SB-45-008A	7.0	8.66

ATTACHMENT E-8a

CONTAMINATED SOIL METHOD BLANK SAMPLES AND ASSOCIATED FIELD SAMPLES

Lot	Compound	Method	Concentration (µg/g)	Samples Affected	Depth (feet)	Concentration (µg/g)
				SB-45-008B	10.0	6.91

ATTACHMENT E-8a

CONTAMINATED SOIL METHOD BLANK SAMPLES AND ASSOCIATED FIELD SAMPLES

Lot	Compound	Method	Concentration (µg/g)	Samples Affected	Depth (feet)	Concentration (µg/g)
UBVB (con't)	Chromium	JS16	0.48	None	--	--
	Vanadium	JS16	1.02	EP-42-001B	7.0	4.40
				EP-42-002B	6.0	2.94
				SB-45-002B	12.0	2.64
				SB-45-003A	8.0	3.07
				SB-45-003B	10.0	4.38
				SB-45-005A	12.0	2.88
				SB-45-006A	10.0	2.42
				SB-45-006B	11.5	2.51
				SB-45-007B	12.0	3.51
				SB-45-008A	7.0	3.37
				SB-45-008B	10.0	2.86
				SB-45-009A	8.0	2.20
				SB-45-009B	11.0	3.19
				SB-45-011B	10.5	4.51
				SB-45-008A DUP	7.0	3.51
				SB-48-002B	10.0	4.44
UBWB	Aluminum	JS16	327	None*	--	--
	Barium	JS16	8.54	None*	--	--
	Calcium	JS16	237	None*	--	--
	Copper	JS16	0.462	None	--	--
	Iron	JS16	645	None*	--	--
	Potassium	JS16	89.5	None*	--	--
	Magnesium	JS16	111	None*	--	--
	Manganese	JS16	25.3	None*	--	--
	Sodium	JS16	51.5	None*	--	--
	Zinc	JS16	2.08	SB-45-012A	8.5	9.77
				SB-45-012B	10.5	7.44

ATTACHMENT E-8a

CONTAMINATED SOIL METHOD BLANK SAMPLES AND ASSOCIATED FIELD SAMPLES

Lot	Compound	Method	Concentration (µg/g)	Samples Affected	Depth (feet)	Concentration (µg/g)
UBWB (cont'd)	Zinc (con't)			SB-45-014A	9.0	7.79
				SB-48-001B	9.5	7.05
	Vanadium	JS16	1.44	SB-42-050A	0.5	6.29
				SB-42-051A	0.5	5.56
				SB-45-012A	8.5	4.37
				SB-45-012B	10.5	3.83
				SB-45-013A	7.0	6.35
				SB-45-013B	9.0	4.33
				SB-45-014A	9.0	4.76
				SB-45-014B	10.5	5.92
				SB-48-001B	9.5	3.44

* Concentrations of these metals are characteristic of the sand used for the soil method blank anaysis.

ATTACHMENT E-8b

CONTAMINATED WATER METHOD BLANK SAMPLES
AND AFFECTED FIELD SAMPLES
(Page 1 of 3)

Lot	Compound	Method	Concentration (µg/L)	Samples Affected	Concentration (µg/L)
Volatile Organic Compounds					
GBKA	Chloroform	UM20	0.32	None	--
	Acetone	UM20	0.98	None	--
XDPB	Chloroform	UM20	0.43	N-142-93 DUP	0.70
	Methylene Chloride	UM20	8.8	None	--
	Acetone	UM20	10	None	--
XDRB	Methylene Chloride	UM20	4.5	None	--
	Acetone	UM20	3.7	None	--
Semivolatile Organic Compounds					
GCUA	Bis(2-ethylhexyl)phthalate	UM18	6.7	None	--
	Di-n-butylphthalate	UM18	0.11	None	--
IFMA	Butylbenzylphthalate	UM18	0.13	None	--
	Phenol	UM18	0.37	None	--
	Bis(2-ethylhexyl)phthalate	UM18	1.3	None	--
	Di-n-butylphthalate	UM18	0.05	None	--
IFTA	Bis(2-ethylhexyl)phthalate	UM18	5.4	None	--
	Phenol	UM18	1.83	None	--
WDFB	1,2-Epoxycyclohexane	UM18	1.0	None	--
WDHA	Phenol	UM18	0.46	None	--
Explosives					
THAA	1,3-Dinitrobenzene	UW32	0.005	None	--

ATTACHMENT E-8b

CONTAMINATED WATER METHOD BLANK SAMPLES AND AFFECTED FIELD SAMPLES
(Page 2 of 3)

Lot	Compound	Method	Concentration (µg/L)	Samples Affected	Concentration (µg/L)
THAB	1,3-Dinitrobenzene	UW32	0.056	None	--
	1,3,5-Trinitrobenzene	UW32	0.092	None	--

ATTACHMENT E-8b

CONTAMINATED WATER METHOD BLANK SAMPLES AND AFFECTED FIELD SAMPLES
(Page 3 of 3)

Lot	Compound	Method	Concentration (µg/L)	Samples Affected	Concentration (µg/L)
Metals					
EVVA	Total Zinc	SS10	16.5	WW-3	30.6
				WW-3 DUP	25.6
ZFGA	Calcium	SS10	107	None	--
ZFTA	Total Zinc	SS10	11.5	None	--
Water Quality Parameters					
TEJF	Alkalinity	310.1	5000	None	--
TEQH	Alkalinity	310.1	3000	None	--
TEYG	Total Dissolved Solids	160.1	2000	None	--

ATTACHMENT E-9

SUMMARY OF DETECTABLE CONCENTRATIONS IN TRIP BLANK SAMPLES ADDENDUM SOIL SAMPLES

ATTACHMENT E-9
SUMMARY OF DETECTABLE CONCENTRATIONS IN TRIP BLANK SAMPLES
ADDENDUM SOIL SAMPLES

Trip Blank Identification	Date Collected	Compound	Concentration (µg/L)	Samples Affected	Date Collected	Concentration
TRIP-1	5/23/94	Acetone	15	TNEQB-14 *	5/24/94	2.3 µg/L
		Methylene Chloride	3.4	None	- -	- -
TRIP-2	5/25/94	Acetone	18	None	- -	- -
		Methylene Chloride	3.7	None	- -	- -
TRIP-3	5/27/94	Acetone	19	SB-48-002A *	5/27/94	0.049 µg/g
TRIP-4	5/31/94	Acetone	21	SB-42-050B *	5/31/94	0.029 µg/g

* Sample qualified as nondetect and flagged with a "U" for acetone based on detection in the associated trip blank sample.

ATTACHMENT E-10

EQUIPMENT RINSATE BLANK RESULTS

ATTACHMENT E-10

EQUIPMENT RINSATE BLANKS WITH DETECTABLE CONCENTRATIONS AND ASSOCIATED SAMPLES

Equipment Rinsate Blank Identification	Date Collected	Analyte Detected	Concentration (µg/L)	Associated Sample	Depth (feet)	Con-centration	Units
TNEQB-1	11/3/93	Aluminum	92.1	SB-20-015C	3.0	2350	(µg/g)
		Barium	2.67			50.1	(µg/g)
		Calcium	570			6780	(µg/g)
		Chromium	4.00			6.36	(µg/g)
		Copper	16.2			9.52	(µg/g)
		Iron	227			4640	(µg/g)
		Potassium	953			695	(µg/g)
		Manganese	5.2			185	(µg/g)
		Zinc	16.5			13.2	(µg/g)
TNEQB-2	11/4/93	Calcium	396	SB-20-001C	3.0	29400	(µg/g)
		Copper	4.61			3.61	(µg/g)
		Iron	37.9			2390	(µg/g)
		Manganese	1.7			123	(µg/g)
		Zinc	33.3			9.16	(µg/g)
TNEQB-3	10/7/93	Sample not analyzed.					
TNEQB-4	10/25/93	No analytes detected.		SB-34-012C	3.0		
TNEQB-5	10/26/93	Barium	38.5	SB-34-001E	20.0	18.2	(µg/g)
		Calcium	71,700			37300	(µg/g)
		Iron	211			1620	(µg/g)
		Potassium	2230			310	(µg/g)
		Magnesium	25,000			2460	(µg/g)
		Manganese	10.2			48.5	(µg/g)
		Sodium	56,200			359	(µg/g)
		Zinc	24.5			7.75	(µg/g)
TNEQB-6	10/6/93	Barium	65.6	SB-37-006C	3.0		
		Calcium	103,000				
		Potassium	4040				
		Magnesium	38,700				
		Sodium	98,800				

ATTACHMENT E-10

EQUIPMENT RINSATE BLANKS WITH DETECTABLE CONCENTRATIONS AND ASSOCIATED SAMPLES

Equipment Rinsate Blank Identification	Date Collected	Analyte Detected	Concentration (µg/L)	Associated Sample	Depth (feet)	Con-centration	Units
TNEQB-7	10/13/93	Barium	64.2	SB-42-022D	10.0	21.2	(µg/g)
		Calcium	100,000			65000	(µg/g)
		Iron	123			2150	(µg/g)
		Potassium	4010			358	(µg/g)
		Magnesium	37,800			4220	(µg/g)
		Manganese	4.4			66.5	(µg/g)
		Sodium	96,100			269	(µg/g)
TNEQB-8	10/19/93	Barium	61.2	SB-42-028D	10.0	33	(µg/g)
		Calcium	96,500			65000	(µg/g)
		Chromium	4.31			9.56	(µg/g)
		Copper	7.72			3.77	(µg/g)
		Iron	195			3020	(µg/g)
		Potassium	4130			550	(µg/g)
		Magnesium	36,900			6110	(µg/g)
		Manganese	8.1			89.2	(µg/g)
		Sodium	92,000			427	(µg/g)
		Lead	2.5			<10.5	(µg/g)
		Vanadium	7.2			5.8	(µg/g)
		Zinc	16.9			11.7	(µg/g)
TNEQB-9	Not collected.						
TNEQB-10	11/5/93	Barium	54.1	SB-42-016A	7.0	10.9	(µg/g)
		Calcium	125,000			87000	(µg/g)
		Copper	11.0			1.35	(µg/g)
		Iron	85.8			1150	(µg/g)
		Potassium	3,900			123	(µg/g)
		Magnesium	50,200			3400	(µg/g)
		Manganese	9.9			50.4	(µg/g)
		Sodium	109,000			237	(µg/g)
		Lead	2.0			<10.5	(µg/g)
		Zinc	105			7.14	(µg/g)

ATTACHMENT E-10

EQUIPMENT RINSATE BLANKS WITH DETECTABLE CONCENTRATIONS AND ASSOCIATED SAMPLES

Equipment Rinsate Blank Identification	Date Collected	Analyte Detected	Concentration (µg/L)	Associated Sample	Depth (feet)	Con-centration	Units
TNEQB-11	11/8/93	Barium	53.9	SB-42-016D	77.0	59.7	(µg/g)
		Calcium	122,000			72000	(µg/g)
		Chromium	4.29			8.87	(µg/g)
		Copper	24.6			6.86	(µg/g)
		Iron	412			4960	(µg/g)
		Potassium	4,120			1080	(µg/g)
		Magnesium	49,500			7090	(µg/g)
TNEQB-11	11/8/93	Manganese	12.1			96.6	(µg/g)
(con't)		Sodium	107,000			458	(µg/g)
		Lead	7.0			7.61	(µg/g)
		Zinc	112			23.1	(µg/g)
TNEQB-12	10/22/93	Barium	20.0	SB-42-048B	5.0	51.8	(µg/g)
		Calcium	2960			68000	(µg/g)
		Copper	5.37			9.75	(µg/g)
		Iron	33.7			4830	(µg/g)
		Potassium	329			614	(µg/g)
		Magnesium	849			5770	(µg/g)
		Manganese	2.3			114	(µg/g)
		Sodium	1,600			459	(µg/g)
		Chloroform	3.1			Not Analyzed.	
TNEQB-13	11/23/93	Barium	61.5	T-7	322.0	31.8	µg/L
		Calcium	103,000			137000	µg/L
		Chromium	4.83			5.79	µg/L
		Iron	49			186	µg/L
		Potassium	3,950			6590	µg/L
		Magnesium	39,400			58700	µg/L
		Manganese	2.2			2.64	µg/L
		Sodium	101,000			137000	µg/L
		Zinc	41.1			69.4	µg/L

ATTACHMENT E-10

EQUIPMENT RINSATE BLANKS WITH DETECTABLE CONCENTRATIONS AND ASSOCIATED SAMPLES

Equipment Rinsate Blank Identification	Date Collected	Analyte Detected	Concentration (µg/L)	Associated Sample	Depth (feet)	Con-centration	Units
	Addendum Equipment Rinsate Blanks						
TNEQB-13	5/31/94	Barium	57	SB-42-051B	2.0	58.4	µg/g
		Calcium	102000			8090	µg/g
		Copper	12.8			27	µg/g
		Iron	52.4			3960	µg/g
		Potassium	4040			571	µg/g
		Magnesium	40000			2540	µg/g
		Manganese	1.6			162	µg/g
		Sodium	102000			343	µg/g
		Lead	1.8			39	µg/g
		Selenium	4.9			0.25	µg/g
		Zinc	13.3			26.2	µg/g
		Arsenic	2.77			2.84	µg/g
TNEQB-14	5/24/94	Barium	62.2	SB-45-003B	10.0	38.8	µg/g
		Calcium	101000			61000	µg/g
		Chromium	3.16			45.1	µg/g
		Copper	9.9			3.91	µg/g
		Potassium	4010			404	µg/g
		Magnesium	38800			5680	µg/g
		Sodium	98700			384	µg/g
		Lead	1.4			10.5	µg/g
		Selenium	4.2			0.756	µg/g
		Arsenic	3.1			2.62	µg/g
		Chloroform	0.62			ND	
		Methylene Chloride	2.3			ND	
TNEQB-15	5/27/94	Barium	60.2	SB-48-002B	10.0	47.8	µg/g
		Calcium	99300			66000	µg/g
		Chromium	3.33			11.5	µg/g
		Copper	12.5			3.72	µg/g
		Iron	82.2			2880	µg/g
		Potassium	3790			357	µg/g
		Magnesium	38200			6500	µg/g
		Manganese	2.5			99.4	µg/g
		Sodium	96600			470	µg/g

ATTACHMENT E-10

EQUIPMENT RINSATE BLANKS WITH DETECTABLE CONCENTRATIONS AND ASSOCIATED SAMPLES

Equipment Rinsate Blank Identification	Date Collected	Analyte Detected	Concentration (µg/L)	Associated Sample	Depth (feet)	Con-centration	Units
TNEQB-15 (con't)	5/27/94	Lead	2.3			10.5	µg/g
		Selenium	4.5			0.872	µg/g
		Zinc	17.3			10.3	µg/g
		Arsenic	3.2			4.07	µg/g
TNEQB-16	6/1/94	Barium	58.7	SB-45-014B	10.5	21.6	µg/g
		Calcium	102000			53700	µg/g
		Chromium	3.3			7.21	µg/g
		Copper	24.6			4.05	µg/g
		Iron	111			1780	µg/g
		Potassium	4470			220	µg/g
		Magnesium	40000			9630	µg/g
		Manganese	2.9			70.5	µg/g
		Sodium	101000			608	µg/g
		Lead	5.5			10.5	µg/g
		Vanadium	5.8			5.92	µg/g
		Zinc	16.7			10.7	µg/g
		Arsenic	3.73			1.24	µg/g
		Bis(2-ethylhexyl)phthalate	25			ND	
TNEQB-17	6/9/94	No analytes detected		SB-45-013B	9.0		

ATTACHMENT E-11

SOURCE WATER SAMPLE RESULTS

ATTACHMENT E-11

SOURCE WATER SAMPLE SUMMARY

Well Name	Date Sampled	Analyte Detected	Concentration (ug/L)
WW-3	8/4/93	Barium	87.6
		Calcium	143000
		Chromium	6.38
		Copper	13.8
		Potassium	5260
		Magnesium	54000
		Sodium	134000
		Zinc	30.6*
WW-3 DUP	8/4/93	Barium	60.6
		Calcium	101000
		Potassium	4470
		Magnesium	37800
		Sodium	93800
		Zinc	25.6*
		1,2-Dichloroethane	0.57

* Qualified as nondetect due to detection of zinc in associated method blank at a concentration of 16.5 µg/L.

ATTACHMENT E-12

SAMPLE DILUTION REPORT

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
AHOL	SB-37-002A	0	LM18	2	Benzo[k]fluoranthene	.8			UGG	10/06/93	ES	OIL2*132	HZZA
					Pyrene	5			UGG	10/06/93	ES	OIL2*132	HZZA
AHOL	SB-37-007A	0	LM18	5	1,2,4-Trichlorobenzene	< .2			UGG	11/09/93	ES	OIL2*287	OEEA
					1,2-Dichlorobenzene	< .6			UGG	11/09/93	ES	OIL2*287	OEEA
					1,2-Diphenylhydrazine	< .5	R		UGG	11/09/93	ES	OIL2*287	OEEA
					1,3-Dichlorobenzene	< .6			UGG	11/09/93	ES	OIL2*287	OEEA
					1,4-Dichlorobenzene	< .5			UGG	11/09/93	ES	OIL2*287	OEEA
					2,4,5-Trichlorophenol	< .5			UGG	11/09/93	ES	OIL2*287	OEEA
					2,4,6-Trichlorophenol	< .8			UGG	11/09/93	ES	OIL2*287	OEEA
					2,4-Dichlorophenol	< .9			UGG	11/09/93	ES	OIL2*287	OEEA
					2,4-Dimethylphenol	< 3			UGG	11/09/93	ES	OIL2*287	OEEA
					2,4-Dinitrophenol	< 6			UGG	11/09/93	ES	OIL2*287	OEEA
					2,4-Dinitrotoluene	< .7			UGG	11/09/93	ES	OIL2*287	OEEA
					2,6-Dinitrotoluene	< .4			UGG	11/09/93	ES	OIL2*287	OEEA
					2-Chloronaphthalene	< .2			UGG	11/09/93	ES	OIL2*287	OEEA
					2-Chlorophenol	< .3			UGG	11/09/93	ES	OIL2*287	OEEA
					2-Methyl-4,6-dinitrophenol / 4,6-Dinitro-2-cresol	< 3			UGG	11/09/93	ES	OIL2*287	OEEA
					2-Methylnaphthalene	< .2			UGG	11/09/93	ES	OIL2*287	OEEA
					2-Methylphenol / 2-cresol	< .1			UGG	11/09/93	ES	OIL2*287	OEEA
					2-Nitroaniline	< .3			UGG	11/09/93	ES	OIL2*287	OEEA
					2-Nitrophenol	< .7			UGG	11/09/93	ES	OIL2*287	OEEA
					3,3-Dichlorobenzidine	< 30			UGG	11/09/93	ES	OIL2*287	OEEA
					3-Methyl-4-chlorophenol / 4-Chloro-m-cresol	< .5			UGG	11/09/93	ES	OIL2*287	OEEA
					3-Nitroaniline	< 2			UGG	11/09/93	ES	OIL2*287	OEEA
					4-Bromophenylphenyl ether	< .2			UGG	11/09/93	ES	OIL2*287	OEEA
					4-Chloroaniline	< 4			UGG	11/09/93	ES	OIL2*287	OEEA
					4-Chlorophenylphenyl ether	< .2			UGG	11/09/93	ES	OIL2*287	OEEA
					4-Methylphenol / 4-Cresol / p-Cresol	< 1			UGG	11/09/93	ES	OIL2*287	OEEA
					4-Nitroaniline	< 2			UGG	11/09/93	ES	OIL2*287	OEEA
					4-Nitrophenol	< 7			UGG	11/09/93	ES	OIL2*287	OEEA
					9h-carbazole (TIC)	< .5	R		UGG	11/09/93	ES	OIL2*287	OEEA
					Acenaphthene	< .2			UGG	11/09/93	ES	OIL2*287	OEEA
					Acenaphthylene	< .2			UGG	11/09/93	ES	OIL2*287	OEEA
					Aldrin	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					Anthracene	< .2			UGG	11/09/93	ES	OIL2*287	OEEA
					Benzidine	< 4	R		UGG	11/09/93	ES	OIL2*287	OEEA
					Benzo[a]anthracene	< .8			UGG	11/09/93	ES	OIL2*287	OEEA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
AHOL	SB-37-007A	0	LM18	5	Benzo[a]pyrene	< 1			UGG	11/09/93	ES	OIL2*287	OEEA
					Benzo[b]fluoranthene	< 1			UGG	11/09/93	ES	OIL2*287	OEEA
					Benzo[g,h,i]perylene	< 1			UGG	11/09/93	ES	OIL2*287	OEEA
					Benzo[k]fluoranthene	< .3			UGG	11/09/93	ES	OIL2*287	OEEA
					Benzoic acid	< 30	R		UGG	11/09/93	ES	OIL2*287	OEEA
					Benzyl alcohol	< 1			UGG	11/09/93	ES	OIL2*287	OEEA
					Bis (2-chloroethoxy) methane	< .3			UGG	11/09/93	ES	OIL2*287	OEEA
					Bis (2-chloroethyl) ether	< .2			UGG	11/09/93	ES	OIL2*287	OEEA
					Bis (2-chloroisopropyl) ether	< 1			UGG	11/09/93	ES	OIL2*287	OEEA
					Bis (2-ethylhexyl) phthalate	< 3			UGG	11/09/93	ES	OIL2*287	OEEA
					Butylbenzyl phthalate	< .8			UGG	11/09/93	ES	OIL2*287	OEEA
					Chrysene	< .6			UGG	11/09/93	ES	OIL2*287	OEEA
					Di-n-butyl phthalate	< .3			UGG	11/09/93	ES	OIL2*287	OEEA
					Di-n-octyl phthalate	< 1			UGG	11/09/93	ES	OIL2*287	OEEA
					Dibenz[A,H]anthracene	< 1			UGG	11/09/93	ES	OIL2*287	OEEA
					Dibenzofuran	< .2			UGG	11/09/93	ES	OIL2*287	OEEA
					Dieldrin	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					Diethyl phthalate	< 1			UGG	11/09/93	ES	OIL2*287	OEEA
					Dimethyl phthalate	< .8			UGG	11/09/93	ES	OIL2*287	OEEA
					Endosulfan sulfate	< 3	R		UGG	11/09/93	ES	OIL2*287	OEEA
					Endrin	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					Endrin aldehyde	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					Endrin ketone	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					Fluoranthene	.6			UGG	11/09/93	ES	OIL2*287	OEEA
					Fluorene	< .2			UGG	11/09/93	ES	OIL2*287	OEEA
					Heptachlor	< .5	R		UGG	11/09/93	ES	OIL2*287	OEEA
					Heptachlor epoxide	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					Hexachlorobenzene	< .2			UGG	11/09/93	ES	OIL2*287	OEEA
					Hexachlorobutadiene / Hexachloro-1,3-butadiene	< 1			UGG	11/09/93	ES	OIL2*287	OEEA
					Hexachlorocyclopentadiene	< 30			UGG	11/09/93	ES	OIL2*287	OEEA
					Hexachloroethane	< .8			UGG	11/09/93	ES	OIL2*287	OEEA
					Indeno[1,2,3-C,D]pyrene	< 1			UGG	11/09/93	ES	OIL2*287	OEEA
					Isophorone	< .2			UGG	11/09/93	ES	OIL2*287	OEEA
					Lindane / gamma-Benzenehexachloride	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					Methoxychlor	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					N-Nitrosodi-N-propylamine	< 1			UGG	11/09/93	ES	OIL2*287	OEEA
					N-Nitrosodimethylamine	< .5	R		UGG	11/09/93	ES	OIL2*287	OEEA
					Napthalene	< .2			UGG	11/09/93	ES	OIL2*287	OEEA
					Nitrobenzene	< .2			UGG	11/09/93	ES	OIL2*287	OEEA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
AHOL	SB-37-007A	0	LM18	5	PCB 1016	< 5	R		UGG	11/09/93	ES	OIL2*287	OEEA
					PCB 1221	< 5	R		UGG	11/09/93	ES	OIL2*287	OEEA
					PCB 1232	< 5	R		UGG	11/09/93	ES	OIL2*287	OEEA
					PCB 1242	< 5	R		UGG	11/09/93	ES	OIL2*287	OEEA
					PCB 1248	< 10	R		UGG	11/09/93	ES	OIL2*287	OEEA
					PCB 1254	< 10	R		UGG	11/09/93	ES	OIL2*287	OEEA
					PCB 1260	< 20	R		UGG	11/09/93	ES	OIL2*287	OEEA
					Pentachlorophenol	< 6			UGG	11/09/93	ES	OIL2*287	OEEA
					Phenanthrene	.4			UGG	11/09/93	ES	OIL2*287	OEEA
					Phenol	< .6			UGG	11/09/93	ES	OIL2*287	OEEA
					Pyrene	.4			UGG	11/09/93	ES	OIL2*287	OEEA
					Toxaphene	< 20	R		UGG	11/09/93	ES	OIL2*287	OEEA
					alpha-Benzenehexachloride / alpha-Hexachlorocyclohexane	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					alpha-Chlordane	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					alpha-Endosulfan / Endosulfan I	< 3	R		UGG	11/09/93	ES	OIL2*287	OEEA
					beta-Benzenehexachloride / beta-Hexachlorocyclohexane	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					beta-Endosulfan / Endosulfan II	< 3	R		UGG	11/09/93	ES	OIL2*287	OEEA
					delta-Benzenehexachloride / delta-Hexachlorocyclohexane	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					gamma-Chlordane	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					n-Nitrosodiphenylamine	< 1			UGG	11/09/93	ES	OIL2*287	OEEA
					p,p-DDD	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					p,p-DDE	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
					p,p-DDT	< 2	R		UGG	11/09/93	ES	OIL2*287	OEEA
BORE	SB-20-001A	0	JD19	4	Arsenic	3.8			UGG	11/04/93	ES	NSOIL2*1	QBFA
					Arsenic	8.2	D		UGG	11/04/93	ES	SOIL2*67	QBGA
BORE	SB-20-001B	1.5	JD19	4	Arsenic	6.1			UGG	11/04/93	ES	NSOIL2*2	QBFA
BORE	SB-20-002A	0	JD19	2	Arsenic	6.4			UGG	11/02/93	ES	NSOIL2*4	QBEA
BORE	SB-20-002B	1.5	JD19	2	Arsenic	8.2			UGG	11/02/93	ES	NSOIL2*5	QBEA
BORE	SB-20-003A	0	JD19	2	Arsenic	6.7			UGG	11/02/93	ES	NSOIL2*7	QBEA
BORE	SB-20-007B	1.5	JD19	2	Arsenic	5			UGG	11/03/93	ES	SOIL2*20	QBFA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-20-007C	3	JD19	2	Arsenic	6			UGG	11/03/93	ES	SOIL2*21	QBFA
BORE	SB-20-008A	0	JD19	2	Arsenic	6.7			UGG	11/04/93	ES	SOIL2*22	QBFA
BORE	SB-20-008B	1.5	JD19	2	Arsenic	6.6			UGG	11/04/93	ES	SOIL2*23	QBFA
BORE	SB-20-008C	3	JD19	2	Arsenic	6.2			UGG	11/04/93	ES	SOIL2*24	QBFA
BORE	SB-20-009A	0	JD19	2	Arsenic	5			UGG	11/04/93	ES	SOIL2*25	QBFA
BORE	SB-20-009B	1.5	JD19	2	Arsenic	5.7			UGG	11/04/93	ES	SOIL2*26	QBFA
BORE	SB-20-009C	3	JD19	2	Arsenic	5			UGG	11/04/93	ES	SOIL2*27	QBFA
BORE	SB-20-010A	0	JD19	2	Arsenic	9			UGG	11/04/93	ES	SOIL2*28	QBFA
BORE	SB-20-010B	1.5	JD19	2	Arsenic	7.2			UGG	11/04/93	ES	SOIL2*29	QBFA
BORE	SB-20-011A	0	JD19	2	Arsenic	6.7			UGG	11/03/93	ES	SOIL2*31	QBFA
BORE	SB-20-011B	1.5	JD19	2	Arsenic	6.1			UGG	11/03/93	ES	SOIL2*32	QBFA
BORE	SB-20-011C	3	JD19	2	Arsenic	4.3			UGG	11/03/93	ES	SOIL2*33	QBFA
BORE	SB-20-012A	0	JD19	2	Arsenic	14			UGG	11/03/93	ES	SOIL2*34	QBFA
					Arsenic	14	D		UGG	11/03/93	ES	SOIL2*65	QBEA
BORE	SB-20-012B	1.5	JD19	2	Arsenic	10			UGG	11/03/93	ES	SOIL2*35	QBFA
BORE	SB-20-013A	0	JD19	2	Arsenic	4.8			UGG	11/03/93	ES	SOIL2*37	QBFA
BORE	SB-20-013B	1.5	JD19	2	Arsenic	4.7			UGG	11/03/93	ES	SOIL2*38	QBFA
BORE	SB-20-013C	3	JD19	2	Arsenic	4.6			UGG	11/03/93	ES	SOIL2*39	QBFA
BORE	SB-20-013C	3	JS16	10	Calcium	63000			UGG	11/03/93	ES	SOIL2*39	UBIA
BORE	SB-20-014A	0	JD19	2	Arsenic	5.6			UGG	11/03/93	ES	SOIL2*40	QBFA

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-20-014B	1.5	JD19	2	Arsenic	4.9			UGG	11/03/93	ES	SOIL2*41	QBFA
BORE	SB-20-014C	3	JD19	2	Arsenic	4.9			UGG	11/03/93	ES	SOIL2*42	QBFA
BORE	SB-20-015A	0	JD19	2	Arsenic	5.1			UGG	11/03/93	ES	SOIL2*43	QBFA
BORE	SB-20-015B	1.5	JD19	2	Arsenic	5.5			UGG	11/03/93	ES	SOIL2*44	QBFA
BORE	SB-20-015C	3	JD19	2	Arsenic	5.2			UGG	11/03/93	ES	SOIL2*45	QBFA
BORE	SB-20-016A	0	JD19	2	Arsenic	6.3			UGG	11/04/93	ES	SOIL2*46	QBGA
BORE	SB-20-016B	1.5	JD19	2	Arsenic	7.2			UGG	11/04/93	ES	SOIL2*47	QBGA
BORE	SB-20-016C	3	JD19	2	Arsenic	6.2			UGG	11/04/93	ES	SOIL2*48	QBGA
BORE	SB-20-017A	0	JD19	2	Arsenic	6.6			UGG	11/04/93	ES	SOIL2*49	QBGA
BORE	SB-20-017B	1.5	JD19	2	Arsenic	5.7			UGG	11/04/93	ES	SOIL2*50	QBGA
					Arsenic	6.4	D		UGG	11/04/93	ES	SOIL2*66	QBGA
BORE	SB-20-017C	3	JD19	2	Arsenic	7.2			UGG	11/04/93	ES	SOIL2*51	QBGA
BORE	SB-20-018A	0	JD19	2	Arsenic	6.9			UGG	11/03/93	ES	SOIL2*52	QBEA
BORE	SB-20-019A	0	JD19	2	Arsenic	6.2	D		UGG	11/02/93	ES	SOIL2*62	QBEA
BORE	SB-34-001A	0	LH10	5	Dieldrin	.04	D		UGG	10/26/93	ES	OIL2*115	IAIA
BORE	SB-34-001A	0	LH10	100	alpha-Chlordane	1.4	SD		UGG	10/26/93	ES	OIL2*115	IAIA
					gamma-Chlordane	1.3	SD		UGG	10/26/93	ES	OIL2*115	IAIA
					p,p-DDD	1.5	D		UGG	10/26/93	ES	OIL2*115	IAIA
					p,p-DDE	2.4	D		UGG	10/26/93	ES	OIL2*115	IAIA
BORE	SB-34-001A	0	LH10	400	p,p-DDT	5.1	D		UGG	10/26/93	ES	OIL2*115	IAIA
BORE	SB-34-001A	0	LH10	5	Dieldrin	.067			UGG	10/26/93	ES	SOIL2*70	IAIA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-34-001A	0	LH10	20	Endrin	.49			UGG	10/26/93	ES	SOIL2*70	IAIA
BORE	SB-34-001A	0	LH10	100	alpha-Chlordane	1.3	S		UGG	10/26/93	ES	SOIL2*70	IAIA
					gamma-Chlordane	1.2	S		UGG	10/26/93	ES	SOIL2*70	IAIA
					p,p-DDE	2.4			UGG	10/26/93	ES	SOIL2*70	IAIA
BORE	SB-34-001A	0	LH10	500	p,p-DDT	5.1			UGG	10/26/93	ES	SOIL2*70	IAIA
BORE	SB-34-001B	6	JS16	10	Calcium	92000			UGG	10/26/93	ES	SOIL2*71	HWTA
BORE	SB-34-001B	6	LH10	5	p,p-DDD	.029	1		UGG	10/26/93	ES	SOIL2*71	IAIA
					p,p-DDE	.036			UGG	10/26/93	ES	SOIL2*71	IAIA
					p,p-DDT	.085			UGG	10/26/93	ES	SOIL2*71	IAIA
BORE	SB-34-001C	10	JS16	10	Calcium	79000			UGG	10/26/93	ES	SOIL2*72	HWTA
BORE	SB-34-002A	0	LH10	20	Endrin	.15			UGG	10/28/93	ES	SOIL2*75	IAIA
BORE	SB-34-002A	0	LH10	50	alpha-Chlordane	.8	S		UGG	10/28/93	ES	SOIL2*75	IAIA
					gamma-Chlordane	.96	S		UGG	10/28/93	ES	SOIL2*75	IAIA
BORE	SB-34-002A	0	LH10	20	p,p-DDE	.38			UGG	10/28/93	ES	SOIL2*75	IAIA
BORE	SB-34-002A	0	LH10	50	p,p-DDT	.9			UGG	10/28/93	ES	SOIL2*75	IAIA
BORE	SB-34-003A	0	LH10	2	Heptachlor	.03			UGG	10/27/93	ES	SOIL2*80	IAIA
BORE	SB-34-003A	0	LH10	20	alpha-Chlordane	.41	S		UGG	10/27/93	ES	SOIL2*80	IAIA
					gamma-Chlordane	.47	S		UGG	10/27/93	ES	SOIL2*80	IAIA
BORE	SB-34-003A	0	LH10	10	p,p-DDE	.21			UGG	10/27/93	ES	SOIL2*80	IAIA
					p,p-DDT	.16			UGG	10/27/93	ES	SOIL2*80	IAIA
BORE	SB-34-003C	11	JS16	10	Calcium	76000			UGG	10/27/93	ES	SOIL2*82	UBAA
BORE	SB-34-003D	15	JS16	10	Calcium	82000			UGG	10/27/93	ES	SOIL2*83	UBAA
BORE	SB-34-004B	1.5	JS16	10	Calcium	59000			UGG	10/24/93	ES	SOIL2*86	UBAA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-34-004C	3	JS16	10	Calcium	80000			UGG	10/24/93	ES	SOIL2*87	UBAA
BORE	SB-34-007B	1.5	JS16	10	Calcium	73000			UGG	10/25/93	ES	SOIL2*95	UBAA
BORE	SB-34-009A	0	LH10	5	Heptachlor	.059			UGG	10/25/93	ES	OIL2*100	IAKA
BORE	SB-34-009A	0	LH10	100	alpha-Chlordane	.79	S		UGG	10/25/93	ES	OIL2*100	IAKA
					gamma-Chlordane	1	S		UGG	10/25/93	ES	OIL2*100	IAKA
BORE	SB-34-009A	0	LH10	50	p,p-DDE	.63			UGG	10/25/93	ES	OIL2*100	IAKA
BORE	SB-34-009A	0	LH10	100	p,p-DDT	1.3			UGG	10/25/93	ES	OIL2*100	IAKA
BORE	SB-34-009A	0	LH10	5	Heptachlor	.064	D		UGG	10/25/93	ES	OIL2*113	IAKA
BORE	SB-34-009A	0	LH10	200	alpha-Chlordane	.91	SD		UGG	10/25/93	ES	OIL2*113	IAKA
					gamma-Chlordane	1.2	SD		UGG	10/25/93	ES	OIL2*113	IAKA
BORE	SB-34-009A	0	LH10	100	p,p-DDE	.75	1D		UGG	10/25/93	ES	OIL2*113	IAKA
					p,p-DDT	1.2	D		UGG	10/25/93	ES	OIL2*113	IAKA
BORE	SB-34-009B	1.5	LH10	2	Heptachlor	.036			UGG	10/25/93	ES	OIL2*101	IAKA
BORE	SB-34-009B	1.5	LH10	80	alpha-Chlordane	.44	S		UGG	10/25/93	ES	OIL2*101	IAKA
					gamma-Chlordane	.57	S		UGG	10/25/93	ES	OIL2*101	IAKA
BORE	SB-34-009B	1.5	LH10	20	p,p-DDE	.4			UGG	10/25/93	ES	OIL2*101	IAKA
BORE	SB-34-009B	1.5	LH10	80	p,p-DDT	.8			UGG	10/25/93	ES	OIL2*101	IAKA
BORE	SB-34-009C	3	LH10	20	alpha-Chlordane	.2	S		UGG	10/25/93	ES	OIL2*102	IAKA
					gamma-Chlordane	.23	S		UGG	10/25/93	ES	OIL2*102	IAKA
					p,p-DDE	.24			UGG	10/25/93	ES	OIL2*102	IAKA
BORE	SB-34-009C	3	LH10	50	p,p-DDT	.57			UGG	10/25/93	ES	OIL2*102	IAKA
BORE	SB-34-010A	0	LH10	3	p,p-DDE	.039			UGG	10/25/93	ES	OIL2*103	IAKA
					p,p-DDT	.044			UGG	10/25/93	ES	OIL2*103	IAKA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-34-011A	0	LH10	10	Lindane / gamma-Benzenehexachloride	.071			UGG	10/25/93	ES	OIL2*106	IAKA
BORE	SB-34-011A	0	LH10	200	gamma-Chlordane	1.2	S		UGG	10/25/93	ES	OIL2*106	IAKA
BORE	SB-34-011A	0	LH10	1000	p,p-DDE	24			UGG	10/25/93	ES	OIL2*106	IAKA
BORE	SB-34-011A	0	LH10	10000	p,p-DDT	160			UGG	10/25/93	ES	OIL2*106	IAKA
BORE	SB-34-011B	1.5	LH10	10	gamma-Chlordane	.093	S		UGG	10/25/93	ES	OIL2*107	IAKA
BORE	SB-34-011B	1.5	LH10	200	p,p-DDE	1.9			UGG	10/25/93	ES	OIL2*107	IAKA
BORE	SB-34-011B	1.5	LH10	1000	p,p-DDT	24			UGG	10/25/93	ES	OIL2*107	IAKA
BORE	SB-34-011C	3	LH10	10	gamma-Chlordane	.093	S		UGG	10/25/93	ES	OIL2*108	IAKA
BORE	SB-34-011C	3	LH10	100	p,p-DDE	.99			UGG	10/25/93	ES	OIL2*108	IAKA
BORE	SB-34-011C	3	LH10	500	p,p-DDT	4.6			UGG	10/25/93	ES	OIL2*108	IAKA
BORE	SB-42-014A	12	JD19	2	Arsenic	2			UGG	11/03/93	ES	OIL2*163	QBGA
BORE	SB-42-014A	12	JS16	10	Calcium	54000			UGG	11/03/93	ES	OIL2*163	UBJA
BORE	SB-42-014B	37	JD19	2	Arsenic	14			UGG	11/03/93	ES	OIL2*164	QBGA
BORE	SB-42-014B	37	JD15	2	Selenium	< .5	D		UGG	11/03/93	ES	OIL2*290	MBGA
BORE	SB-42-014B	37	JD19	2	Arsenic	12	D		UGG	11/03/93	ES	OIL2*290	QBGA
BORE	SB-42-014C	42	JD19	2	Arsenic	3.9			UGG	11/03/93	ES	OIL2*165	QBGA
BORE	SB-42-014D	82	JD19	4	Arsenic	3.3			UGG	11/03/93	ES	OIL2*166	QBGA
BORE	SB-42-014D	82	JS16	10	Calcium	99000			UGG	11/03/93	ES	OIL2*166	UBJA
BORE	SB-42-014E	97	JD19	4	Arsenic	6.8			UGG	11/03/93	ES	OIL2*167	QBGA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-015A	17	JD19	2	Arsenic	2.8			UGG	11/05/93	ES	OIL2*168	QBGA
BORE	SB-42-015A	17	JD15	2	Selenium	< .5	D		UGG	11/05/93	ES	OIL2*291	MBGA
BORE	SB-42-015A	17	JD19	4	Arsenic	3	D		UGG	11/05/93	ES	OIL2*291	QBGA
BORE	SB-42-015B	37	JD19	4	Arsenic	7.2			UGG	11/05/93	ES	OIL2*169	QBGA
BORE	SB-42-015B	37	JS16	10	Calcium	68000			UGG	11/05/93	ES	OIL2*169	UBJA
BORE	SB-42-015C	47	JD19	2	Arsenic	6.1			UGG	11/05/93	ES	OIL2*170	QBGA
BORE	SB-42-015D	77	JD19	2	Arsenic	3.2			UGG	11/05/93	ES	OIL2*171	QBGA
BORE	SB-42-015E	102	JD19	4	Arsenic	3.3			UGG	11/05/93	ES	OIL2*172	QBGA
BORE	SB-42-015E	102	JS16	10	Calcium	95000			UGG	11/05/93	ES	OIL2*172	UBJA
BORE	SB-42-016A	7	JD19	2	Arsenic	6.9			UGG	11/05/93	ES	OIL2*173	QBGA
BORE	SB-42-016A	7	JS16	10	Calcium	87000			UGG	11/05/93	ES	OIL2*173	UBJA
BORE	SB-42-016B	27	JD19	2	Arsenic	1.5			UGG	11/05/93	ES	OIL2*174	QBGA
BORE	SB-42-016C	42	JD19	2	Arsenic	8.8			UGG	11/05/93	ES	OIL2*175	QBHA
BORE	SB-42-016D	77	JD19	2	Arsenic	4.7			UGG	11/08/93	ES	OIL2*176	QBHA
BORE	SB-42-016D	77	JS16	10	Calcium	72000			UGG	11/08/93	ES	OIL2*176	UBKA
BORE	SB-42-016E	102	JS16	10	Calcium	79000			UGG	11/08/93	ES	OIL2*177	UBKA
BORE	SB-42-017A	2	JD19	10	Arsenic	49			UGG	11/08/93	ES	OIL2*178	QBHA
BORE	SB-42-017A	2	JS16	10	Barium	25000			UGG	11/08/93	ES	OIL2*178	UBKA
BORE	SB-42-017A	2	JS16	5	Copper	6500			UGG	11/08/93	ES	OIL2*178	UBKA
					Lead	35000			UGG	11/08/93	ES	OIL2*178	UBKA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-017A	2	JS16	5	Thallium	150			UGG	11/08/93	ES	OIL2*178	UBKA
BORE	SB-42-017B	32	JD19	4	Arsenic	9.7			UGG	11/08/93	ES	OIL2*179	QBHA
BORE	SB-42-017B	32	JS16	10	Calcium	71000			UGG	11/08/93	ES	OIL2*179	UBKA
BORE	SB-42-017C	37	JD19	2	Arsenic	4.9			UGG	11/08/93	ES	OIL2*180	QBHA
BORE	SB-42-017C	37	JD15	2	Selenium	< .5	D		UGG	11/08/93	ES	OIL2*292	MBGA
BORE	SB-42-017C	37	JD19	2	Arsenic	5.5	D		UGG	11/08/93	ES	OIL2*292	QBGA
BORE	SB-42-017D	67	JD19	4	Arsenic	7.5			UGG	11/08/93	ES	OIL2*181	QBHA
BORE	SB-42-017E	92	JD19	4	Arsenic	7.3			UGG	11/08/93	ES	OIL2*182	QBHA
BORE	SB-42-018B	5	JS16	10	Calcium	64000			UGG	10/13/93	ES	OIL2*184	HWKA
BORE	SB-42-018C	7	JS16	10	Calcium	68000			UGG	10/13/93	ES	OIL2*185	HWKA
BORE	SB-42-018D	10	JS16	10	Calcium	62000			UGG	10/13/93	ES	OIL2*186	HWKA
BORE	SB-42-019A	0	JD19	2	Arsenic	18			UGG	10/13/93	ES	OIL2*187	ISCA
BORE	SB-42-019C	9	JS16	10	Calcium	93000			UGG	10/13/93	ES	OIL2*189	HWKA
BORE	SB-42-019D	10	JS16	10	Calcium	88000			UGG	10/13/93	ES	OIL2*190	HWKA
BORE	SB-42-020A	0	JS16	10	Calcium	57000			UGG	10/13/93	ES	OIL2*191	HWKA
BORE	SB-42-020B	4	JS16	10	Calcium	61000			UGG	10/13/93	ES	OIL2*192	HWKA
BORE	SB-42-020C	7	JS16	10	Calcium	86000			UGG	10/13/93	ES	OIL2*193	HWKA
BORE	SB-42-020D	10	JS16	10	Calcium	63000			UGG	10/13/93	ES	OIL2*194	HWKA
BORE	SB-42-021A	0	JS16	10	Calcium	68000			UGG	10/13/93	ES	OIL2*195	HWKA
BORE	SB-42-021B	4	JS16	10	Calcium	67000			UGG	10/13/93	ES	OIL2*196	HWKA

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SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-021B	4	JS16	10	Calcium	87000	D		UGG	10/13/93	ES	OIL2*272	HWKA
BORE	SB-42-021C	7	JS16	10	Calcium	82000			UGG	10/13/93	ES	OIL2*197	HWKA
BORE	SB-42-021D	10	JS16	10	Calcium	78000			UGG	10/13/93	ES	OIL2*198	HWKA
BORE	SB-42-022A	0	JS16	10	Calcium	70000			UGG	10/13/93	ES	OIL2*199	HWKA
BORE	SB-42-022B	3	JS16	10	Calcium	70000			UGG	10/13/93	ES	OIL2*200	HWKA
BORE	SB-42-022D	10	JS16	10	Calcium	65000			UGG	10/13/93	ES	OIL2*202	HWKA
BORE	SB-42-023C	7	JS16	10	Calcium	66000			UGG	10/14/93	ES	OIL2*205	HWRA
BORE	SB-42-023D	10	JS16	10	Calcium	100000			UGG	10/14/93	ES	OIL2*206	HWRA
BORE	SB-42-024B	4	JD19	5	Arsenic	11			UGG	10/14/93	ES	OIL2*208	ISEA
BORE	SB-42-024C	7	JS16	10	Calcium	74000			UGG	10/14/93	ES	OIL2*209	HWRA
BORE	SB-42-024D	10	JS16	10	Calcium	57000			UGG	10/14/93	ES	OIL2*210	HWRA
BORE	SB-42-025C	7	JS16	10	Calcium	68000			UGG	10/14/93	ES	OIL2*213	HWRA
BORE	SB-42-025D	10	JS16	10	Calcium	64000	D		UGG	10/14/93	ES	OIL2*273	HWSA
BORE	SB-42-026A	0	JD19	5	Arsenic	13			UGG	10/19/93	ES	OIL2*215	ISEA
BORE	SB-42-026C	7	JS16	10	Calcium	76000			UGG	10/19/93	ES	OIL2*217	HWRA
BORE	SB-42-026D	10	JS16	10	Calcium	64000			UGG	10/19/93	ES	OIL2*218	HWRA
BORE	SB-42-027B	6	JS16	10	Calcium	71000			UGG	10/19/93	ES	OIL2*220	HWRA
BORE	SB-42-027C	8	JS16	10	Calcium	78000			UGG	10/19/93	ES	OIL2*221	HWRA
BORE	SB-42-027D	10	JS16	10	Calcium	92000			UGG	10/19/93	ES	OIL2*222	HWRA
					Calcium	81000	D		UGG	10/19/93	ES	OIL2*274	HWSA

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SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-028A	0	JD19	4	Arsenic	11			UGG	10/19/93	ES	OIL2*223	ISEA
BORE	SB-42-028B	3	JS16	10	Calcium	82000			UGG	10/19/93	ES	OIL2*224	HWRA
BORE	SB-42-028C	7	JS16	10	Calcium	81000			UGG	10/19/93	ES	OIL2*225	HWSA
BORE	SB-42-028D	10	JS16	10	Calcium	65000			UGG	10/19/93	ES	OIL2*226	HWSA
BORE	SB-42-030A	0	JD19	2	Arsenic	15			UGG	10/20/93	ES	OIL2*231	ISFA
BORE	SB-42-030B	5	JS16	10	Calcium	65000			UGG	10/20/93	ES	OIL2*232	HWSA
BORE	SB-42-031A	0	JD19	2	Arsenic	17			UGG	10/20/93	ES	OIL2*233	ISFA
BORE	SB-42-032A	0	JD19	2	Arsenic	14			UGG	10/20/93	ES	OIL2*235	ISFA
BORE	SB-42-032B	5	JS16	10	Calcium	80000			UGG	10/20/93	ES	OIL2*236	HWSA
BORE	SB-42-034B	5	JS16	10	Calcium	64000			UGG	10/20/93	ES	OIL2*240	HWSA
BORE	SB-42-035B	5	JS16	10	Calcium	85000			UGG	10/21/93	ES	OIL2*242	HWSA
BORE	SB-42-036B	5	JS16	10	Calcium	74000			UGG	10/21/93	ES	OIL2*244	HWSA
BORE	SB-42-037A	0	JS16	10	Calcium	83000			UGG	10/21/93	ES	OIL2*245	HWSA
					Calcium	89000	D		UGG	10/21/93	ES	OIL2*276	HWSA
BORE	SB-42-037B	5	JD19	2	Arsenic	14			UGG	10/21/93	ES	OIL2*246	ISFA
BORE	SB-42-037B	5	JS16	10	Calcium	58000			UGG	10/21/93	ES	OIL2*246	HWSA
BORE	SB-42-038B	5	JS16	10	Calcium	57000			UGG	10/21/93	ES	OIL2*248	HWSA
BORE	SB-42-039B	5	JS16	10	Calcium	57000			UGG	10/21/93	ES	OIL2*250	HWSA
BORE	SB-42-040A	0	JS16	3	Antimony	< 21			UGG	10/22/93	ES	OIL2*251	HWTA
					Lead	12000			UGG	10/22/93	ES	OIL2*251	HWTA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-042B	5	JS16	10	Calcium	100000			UGG	10/22/93	ES	OIL2*256	HWTA
BORE	SB-42-043A	0	JD19	2	Arsenic	6.1			UGG	10/22/93	ES	OIL2*257	ISGA
BORE	SB-42-043B	5	JS16	10	Calcium	67000			UGG	10/22/93	ES	OIL2*258	HWTA
BORE	SB-42-044A	0	JD19	2	Arsenic	13			UGG	10/22/93	ES	OIL2*259	ISGA
BORE	SB-42-045B	5	JS16	10	Calcium	81000			UGG	10/23/93	ES	OIL2*262	HWTA
BORE	SB-42-046A	0	JD19	5	Arsenic	55			UGG	10/23/93	ES	OIL2*263	ISGA
BORE	SB-42-046B	5	JD19	2	Arsenic	14			UGG	10/23/93	ES	OIL2*264	ISGA
BORE	SB-42-047A	0	JD19	2	Arsenic	13			UGG	10/23/93	ES	OIL2*265	ISGA
BORE	SB-42-048A	0	JD19	5	Arsenic	29			UGG	10/22/93	ES	OIL2*267	ISGA
BORE	SB-42-048A	0	LM18	20	1,2,4-Trichlorobenzene	< .8			UGG	10/22/93	ES	OIL2*267	IVWA
					1,2-Dichlorobenzene	< 2			UGG	10/22/93	ES	OIL2*267	IVWA
					1,2-Diphenylhydrazine	< 2	R		UGG	10/22/93	ES	OIL2*267	IVWA
					1,3-Dichlorobenzene	< 3			UGG	10/22/93	ES	OIL2*267	IVWA
					1,4-Dichlorobenzene	< 2			UGG	10/22/93	ES	OIL2*267	IVWA
					2,4,5-Trichlorophenol	< 2			UGG	10/22/93	ES	OIL2*267	IVWA
					2,4,6-Trichlorophenol	< 3			UGG	10/22/93	ES	OIL2*267	IVWA
					2,4-Dichlorophenol	< 4			UGG	10/22/93	ES	OIL2*267	IVWA
					2,4-Dimethylphenol	< 10			UGG	10/22/93	ES	OIL2*267	IVWA
					2,4-Dinitrophenol	< 20			UGG	10/22/93	ES	OIL2*267	IVWA
					2,4-Dinitrotoluene	< 3			UGG	10/22/93	ES	OIL2*267	IVWA
					2,6-Dinitrotoluene	< 2			UGG	10/22/93	ES	OIL2*267	IVWA
					2-Chloronaphthalene	< .7			UGG	10/22/93	ES	OIL2*267	IVWA
					2-Chlorophenol	< 1			UGG	10/22/93	ES	OIL2*267	IVWA
					2-Methyl-4,6-dinitrophenol / 4,6-Dinitro-2-cresol	< 10			UGG	10/22/93	ES	OIL2*267	IVWA
					2-Methylnaphthalene	< 1			UGG	10/22/93	ES	OIL2*267	IVWA
					2-Methylphenol / 2-cresol	< .6			UGG	10/22/93	ES	OIL2*267	IVWA
					2-Nitroaniline	< 1			UGG	10/22/93	ES	OIL2*267	IVWA
					2-Nitrophenol	< 3			UGG	10/22/93	ES	OIL2*267	IVWA
					3,3-Dichlorobenzidine	< 100			UGG	10/22/93	ES	OIL2*267	IVWA

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Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-048A	0	LM18	20	3-Methyl-4-chlorophenol / 4-Chloro-m-cresol	< 2			UGG	10/22/93	ES	OIL2*267	IVWA
					3-Nitroaniline	< 9			UGG	10/22/93	ES	OIL2*267	IVWA
					4-Bromophenylphenyl ether	< .7			UGG	10/22/93	ES	OIL2*267	IVWA
					4-Chloroaniline	< 20			UGG	10/22/93	ES	OIL2*267	IVWA
					4-Chlorophenylphenyl ether	< .7			UGG	10/22/93	ES	OIL2*267	IVWA
					4-Methylphenol / 4-Cresol / p-Cresol	< 5			UGG	10/22/93	ES	OIL2*267	IVWA
					4-Nitroaniline	< 8			UGG	10/22/93	ES	OIL2*267	IVWA
					4-Nitrophenol	< 30			UGG	10/22/93	ES	OIL2*267	IVWA
					9h-carbazole (TIC)	< 2	R		UGG	10/22/93	ES	OIL2*267	IVWA
					Acenaphthene	< .7			UGG	10/22/93	ES	OIL2*267	IVWA
					Acenaphthylene	< .7			UGG	10/22/93	ES	OIL2*267	IVWA
					Aldrin	< 6	R		UGG	10/22/93	ES	OIL2*267	IVWA
					Anthracene	< .7			UGG	10/22/93	ES	OIL2*267	IVWA
					Benzidine	< 20	R		UGG	10/22/93	ES	OIL2*267	IVWA
					Benzo[a]anthracene	< 3			UGG	10/22/93	ES	OIL2*267	IVWA
					Benzo[a]pyrene	< 5			UGG	10/22/93	ES	OIL2*267	IVWA
					Benzo[b]fluoranthene	< 4			UGG	10/22/93	ES	OIL2*267	IVWA
					Benzo[g,h,i]perylene	< 5			UGG	10/22/93	ES	OIL2*267	IVWA
					Benzo[k]fluoranthene	< 1			UGG	10/22/93	ES	OIL2*267	IVWA
					Benzoic acid	< 100	R		UGG	10/22/93	ES	OIL2*267	IVWA
					Benzyl alcohol	< 4			UGG	10/22/93	ES	OIL2*267	IVWA
					Bis (2-chloroethoxy) methane	< 1			UGG	10/22/93	ES	OIL2*267	IVWA
					Bis (2-chloroethyl) ether	< .7			UGG	10/22/93	ES	OIL2*267	IVWA
					Bis (2-chloroisopropyl) ether	< 4			UGG	10/22/93	ES	OIL2*267	IVWA
					Bis (2-ethylhexyl) phthalate	< 10			UGG	10/22/93	ES	OIL2*267	IVWA
					Butylbenzyl phthalate	< 3			UGG	10/22/93	ES	OIL2*267	IVWA
					Chrysene	< 2			UGG	10/22/93	ES	OIL2*267	IVWA
					Di-n-butyl phthalate	< 1			UGG	10/22/93	ES	OIL2*267	IVWA
					Di-n-octyl phthalate	< 4			UGG	10/22/93	ES	OIL2*267	IVWA
					Dibenz[A,H]anthracene	< 4			UGG	10/22/93	ES	OIL2*267	IVWA
					Dibenzofuran	< .7			UGG	10/22/93	ES	OIL2*267	IVWA
					Dieldrin	< 6	R		UGG	10/22/93	ES	OIL2*267	IVWA
					Diethyl phthalate	< 5			UGG	10/22/93	ES	OIL2*267	IVWA
					Dimethyl phthalate	< 3			UGG	10/22/93	ES	OIL2*267	IVWA
					Endosulfan sulfate	< 10	R		UGG	10/22/93	ES	OIL2*267	IVWA
					Endrin	< 10	R		UGG	10/22/93	ES	OIL2*267	IVWA
					Endrin aldehyde	< 10	R		UGG	10/22/93	ES	OIL2*267	IVWA
					Endrin ketone	< 10	R		UGG	10/22/93	ES	OIL2*267	IVWA
					Fluoranthene	< 1			UGG	10/22/93	ES	OIL2*267	IVWA

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Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-048A	0	LM18	20	Fluorene	< .7			UGG	10/22/93	ES	OIL2*267	IVWA
					Heptachlor	< 2	R		UGG	10/22/93	ES	OIL2*267	IVWA
					Heptachlor epoxide	< 6	R		UGG	10/22/93	ES	OIL2*267	IVWA
					Hexachlorobenzene	< .7			UGG	10/22/93	ES	OIL2*267	IVWA
					Hexachlorobutadiene / Hexachloro-1,3-butadiene	< 5			UGG	10/22/93	ES	OIL2*267	IVWA
					Hexachlorocyclopentadiene	< 100			UGG	10/22/93	ES	OIL2*267	IVWA
					Hexachloroethane	< 3			UGG	10/22/93	ES	OIL2*267	IVWA
					Indeno[1,2,3-C,D]pyrene	< 6			UGG	10/22/93	ES	OIL2*267	IVWA
					Isophorone	< .7			UGG	10/22/93	ES	OIL2*267	IVWA
					Lindane / gamma-Benzenehexachloride	< 6	R		UGG	10/22/93	ES	OIL2*267	IVWA
					Methoxychlor	< 6	R		UGG	10/22/93	ES	OIL2*267	IVWA
					N-Nitrosodi-N-propylamine	< 4			UGG	10/22/93	ES	OIL2*267	IVWA
					N-Nitrosodimethylamine	< 2	R		UGG	10/22/93	ES	OIL2*267	IVWA
					Napthalene	< .7			UGG	10/22/93	ES	OIL2*267	IVWA
					Nitrobenzene	< .9			UGG	10/22/93	ES	OIL2*267	IVWA
					PCB 1016	< 20	R		UGG	10/22/93	ES	OIL2*267	IVWA
					PCB 1221	< 20	R		UGG	10/22/93	ES	OIL2*267	IVWA
					PCB 1232	< 20	R		UGG	10/22/93	ES	OIL2*267	IVWA
					PCB 1242	< 20	R		UGG	10/22/93	ES	OIL2*267	IVWA
					PCB 1248	< 40	R		UGG	10/22/93	ES	OIL2*267	IVWA
					PCB 1254	< 40	R		UGG	10/22/93	ES	OIL2*267	IVWA
					PCB 1260	< 60	R		UGG	10/22/93	ES	OIL2*267	IVWA
					Pentachlorophenol	< 30			UGG	10/22/93	ES	OIL2*267	IVWA
					Phenanthrene	< .7			UGG	10/22/93	ES	OIL2*267	IVWA
					Phenol	< 2			UGG	10/22/93	ES	OIL2*267	IVWA
					Pyrene	< .7			UGG	10/22/93	ES	OIL2*267	IVWA
					Toxaphene	< 60	R		UGG	10/22/93	ES	OIL2*267	IVWA
					alpha-Benzenehexachloride / alpha-Hexachlorocyclohexane	< 6	R		UGG	10/22/93	ES	OIL2*267	IVWA
					alpha-Chlordane	< 6	R		UGG	10/22/93	ES	OIL2*267	IVWA
					alpha-Endosulfan / Endosulfan I	< 10	R		UGG	10/22/93	ES	OIL2*267	IVWA
					beta-Benzenehexachloride / beta-Hexachlorocyclohexane	< 6	R		UGG	10/22/93	ES	OIL2*267	IVWA
					beta-Endosulfan / Endosulfan II	< 10	R		UGG	10/22/93	ES	OIL2*267	IVWA
					delta-Benzenehexachloride / delta-Hexachlorocyclohexane	< 6	R		UGG	10/22/93	ES	OIL2*267	IVWA
					gamma-Chlordane	< 6	R		UGG	10/22/93	ES	OIL2*267	IVWA
					n-Nitrosodiphenylamine	< 4			UGG	10/22/93	ES	OIL2*267	IVWA
					p,p-DDD	< 6	R		UGG	10/22/93	ES	OIL2*267	IVWA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-048A	0	LM18	20	p,p-DDE	< 6	R		UGG	10/22/93	ES	OIL2*267	IVWA
					p,p-DDT	< 6	R		UGG	10/22/93	ES	OIL2*267	IVWA
BORE	SB-42-048B	5	JS16	10	Calcium	68000			UGG	10/22/93	ES	OIL2*268	HWTA
BORE	SB-42-048B	5	LM18	5	1,2,4-Trichlorobenzene	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					1,2-Dichlorobenzene	< .6			UGG	10/22/93	ES	OIL2*268	IVWA
					1,2-Diphenylhydrazine	< .5	R		UGG	10/22/93	ES	OIL2*268	IVWA
					1,3-Dichlorobenzene	< .6			UGG	10/22/93	ES	OIL2*268	IVWA
					1,4-Dichlorobenzene	< .5			UGG	10/22/93	ES	OIL2*268	IVWA
					2,4,5-Trichlorophenol	< .5			UGG	10/22/93	ES	OIL2*268	IVWA
					2,4,6-Trichlorophenol	< .8			UGG	10/22/93	ES	OIL2*268	IVWA
					2,4-Dichlorophenol	< .9			UGG	10/22/93	ES	OIL2*268	IVWA
					2,4-Dimethylphenol	< 3			UGG	10/22/93	ES	OIL2*268	IVWA
					2,4-Dinitrophenol	< 6			UGG	10/22/93	ES	OIL2*268	IVWA
					2,4-Dinitrotoluene	< .7			UGG	10/22/93	ES	OIL2*268	IVWA
					2,6-Dinitrotoluene	< .4			UGG	10/22/93	ES	OIL2*268	IVWA
					2-Chloronaphthalene	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					2-Chlorophenol	< .3			UGG	10/22/93	ES	OIL2*268	IVWA
					2-Methyl-4,6-dinitrophenol / 4,6-Dinitro-2-cresol	< 3			UGG	10/22/93	ES	OIL2*268	IVWA
					2-Methylnaphthalene	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					2-Methylphenol / 2-cresol	< .1			UGG	10/22/93	ES	OIL2*268	IVWA
					2-Nitroaniline	< .3			UGG	10/22/93	ES	OIL2*268	IVWA
					2-Nitrophenol	< .7			UGG	10/22/93	ES	OIL2*268	IVWA
					3,3-Dichlorobenzidine	< 30			UGG	10/22/93	ES	OIL2*268	IVWA
					3-Methyl-4-chlorophenol / 4-Chloro-m-cresol	< .5			UGG	10/22/93	ES	OIL2*268	IVWA
					3-Nitroaniline	< 2			UGG	10/22/93	ES	OIL2*268	IVWA
					4-Bromophenylphenyl ether	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					4-Chloroaniline	< 4			UGG	10/22/93	ES	OIL2*268	IVWA
					4-Chlorophenylphenyl ether	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					4-Methylphenol / 4-Cresol / p-Cresol	< 1			UGG	10/22/93	ES	OIL2*268	IVWA
					4-Nitroaniline	< 2			UGG	10/22/93	ES	OIL2*268	IVWA
					4-Nitrophenol	< 7			UGG	10/22/93	ES	OIL2*268	IVWA
					9h-carbazole (TIC)	< .5	R		UGG	10/22/93	ES	OIL2*268	IVWA
					Acenaphthene	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					Acenaphthylene	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					Aldrin	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					Anthracene	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					Benzidine	< 4	R		UGG	10/22/93	ES	OIL2*268	IVWA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-048B	5	LM18	5	Benzo[a]anthracene	< .8			UGG	10/22/93	ES	OIL2*268	IVWA
					Benzo[a]pyrene	< 1			UGG	10/22/93	ES	OIL2*268	IVWA
					Benzo[b]fluoranthene	< 1			UGG	10/22/93	ES	OIL2*268	IVWA
					Benzo[g,h,i]perylene	< 1			UGG	10/22/93	ES	OIL2*268	IVWA
					Benzo[k]fluoranthene	< .3			UGG	10/22/93	ES	OIL2*268	IVWA
					Benzoic acid	< 30	R		UGG	10/22/93	ES	OIL2*268	IVWA
					Benzyl alcohol	< 1			UGG	10/22/93	ES	OIL2*268	IVWA
					Bis (2-chloroethoxy) methane	< .3			UGG	10/22/93	ES	OIL2*268	IVWA
					Bis (2-chloroethyl) ether	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					Bis (2-chloroisopropyl) ether	< 1			UGG	10/22/93	ES	OIL2*268	IVWA
					Bis (2-ethylhexyl) phthalate	< 3			UGG	10/22/93	ES	OIL2*268	IVWA
					Butylbenzyl phthalate	< .8			UGG	10/22/93	ES	OIL2*268	IVWA
					Chrysene	< .6			UGG	10/22/93	ES	OIL2*268	IVWA
					Di-n-butyl phthalate	< .3			UGG	10/22/93	ES	OIL2*268	IVWA
					Di-n-octyl phthalate	< 1			UGG	10/22/93	ES	OIL2*268	IVWA
					Dibenz[A,H]anthracene	< 1			UGG	10/22/93	ES	OIL2*268	IVWA
					Dibenzofuran	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					Dieldrin	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					Diethyl phthalate	< 1			UGG	10/22/93	ES	OIL2*268	IVWA
					Dimethyl phthalate	< .8			UGG	10/22/93	ES	OIL2*268	IVWA
					Endosulfan sulfate	< 3	R		UGG	10/22/93	ES	OIL2*268	IVWA
					Endrin	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					Endrin aldehyde	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					Endrin ketone	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					Fluoranthene	< .3			UGG	10/22/93	ES	OIL2*268	IVWA
					Fluorene	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					Heptachlor	< .5	R		UGG	10/22/93	ES	OIL2*268	IVWA
					Heptachlor epoxide	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					Hexachlorobenzene	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					Hexachlorobutadiene / Hexachloro-1,3-butadiene	< 1			UGG	10/22/93	ES	OIL2*268	IVWA
					Hexachlorocyclopentadiene	< 30			UGG	10/22/93	ES	OIL2*268	IVWA
					Hexachloroethane	< .8			UGG	10/22/93	ES	OIL2*268	IVWA
					Indeno[1,2,3-C,D]pyrene	< 1			UGG	10/22/93	ES	OIL2*268	IVWA
					Isophorone	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					Lindane / gamma-Benzenehexachloride	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					Methoxychlor	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					N-Nitrosodi-N-propylamine	< 1			UGG	10/22/93	ES	OIL2*268	IVWA
					N-Nitrosodimethylamine	< .5	R		UGG	10/22/93	ES	OIL2*268	IVWA
					Napthalene	< .2			UGG	10/22/93	ES	OIL2*268	IVWA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-048B	5	LM18	5	Nitrobenzene	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					PCB 1016	< 5	R		UGG	10/22/93	ES	OIL2*268	IVWA
					PCB 1221	< 5	R		UGG	10/22/93	ES	OIL2*268	IVWA
					PCB 1232	< 5	R		UGG	10/22/93	ES	OIL2*268	IVWA
					PCB 1242	< 5	R		UGG	10/22/93	ES	OIL2*268	IVWA
					PCB 1248	< 10	R		UGG	10/22/93	ES	OIL2*268	IVWA
					PCB 1254	< 10	R		UGG	10/22/93	ES	OIL2*268	IVWA
					PCB 1260	< 20	R		UGG	10/22/93	ES	OIL2*268	IVWA
					Pentachlorophenol	< 6			UGG	10/22/93	ES	OIL2*268	IVWA
					Phenanthrene	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					Phenol	< .6			UGG	10/22/93	ES	OIL2*268	IVWA
					Pyrene	< .2			UGG	10/22/93	ES	OIL2*268	IVWA
					Toxaphene	< 20	R		UGG	10/22/93	ES	OIL2*268	IVWA
					alpha-Benzenehexachloride / alpha-Hexachlorocyclohexane	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					alpha-Chlordane	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					alpha-Endosulfan / Endosulfan I	< 3	R		UGG	10/22/93	ES	OIL2*268	IVWA
					beta-Benzenehexachloride / beta-Hexachlorocyclohexane	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					beta-Endosulfan / Endosulfan II	< 3	R		UGG	10/22/93	ES	OIL2*268	IVWA
					delta-Benzenehexachloride / delta-Hexachlorocyclohexane	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					gamma-Chlordane	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					n-Nitrosodiphenylamine	< 1			UGG	10/22/93	ES	OIL2*268	IVWA
					p,p-DDD	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					p,p-DDE	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
					p,p-DDT	< 2	R		UGG	10/22/93	ES	OIL2*268	IVWA
BORE	SB-42-049A	0	JD19	2	Arsenic	20			UGG	10/22/93	ES	OIL2*269	ISGA
BORE	SB-42-049A	0	LM18	20	1,2,4-Trichlorobenzene	< .8			UGG	10/22/93	ES	OIL2*269	IVWA
					1,2-Dichlorobenzene	< 2			UGG	10/22/93	ES	OIL2*269	IVWA
					1,2-Diphenylhydrazine	< 2	R		UGG	10/22/93	ES	OIL2*269	IVWA
					1,3-Dichlorobenzene	< 3			UGG	10/22/93	ES	OIL2*269	IVWA
					1,4-Dichlorobenzene	< 2			UGG	10/22/93	ES	OIL2*269	IVWA
					2,4,5-Trichlorophenol	< 2			UGG	10/22/93	ES	OIL2*269	IVWA
					2,4,6-Trichlorophenol	< 3			UGG	10/22/93	ES	OIL2*269	IVWA
					2,4-Dichlorophenol	< 4			UGG	10/22/93	ES	OIL2*269	IVWA
					2,4-Dimethylphenol	< 10			UGG	10/22/93	ES	OIL2*269	IVWA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-049A	0	LM18	20	2,4-Dinitrophenol	< 20			UGG	10/22/93	ES	OIL2*269	IVWA
					2,4-Dinitrotoluene	< 3			UGG	10/22/93	ES	OIL2*269	IVWA
					2,6-Dinitrotoluene	< 2			UGG	10/22/93	ES	OIL2*269	IVWA
					2-Chloronaphthalene	< .7			UGG	10/22/93	ES	OIL2*269	IVWA
					2-Chlorophenol	< 1			UGG	10/22/93	ES	OIL2*269	IVWA
					2-Methyl-4,6-dinitrophenol / 4,6-Dinitro-2-cresol	< 10			UGG	10/22/93	ES	OIL2*269	IVWA
					2-Methylnaphthalene	< 1			UGG	10/22/93	ES	OIL2*269	IVWA
					2-Methylphenol / 2-cresol	< .6			UGG	10/22/93	ES	OIL2*269	IVWA
					2-Nitroaniline	< 1			UGG	10/22/93	ES	OIL2*269	IVWA
					2-Nitrophenol	< 3			UGG	10/22/93	ES	OIL2*269	IVWA
					3,3-Dichlorobenzidine	< 100			UGG	10/22/93	ES	OIL2*269	IVWA
					3-Methyl-4-chlorophenol / 4-Chloro-m-cresol	< 2			UGG	10/22/93	ES	OIL2*269	IVWA
					3-Nitroaniline	< 9			UGG	10/22/93	ES	OIL2*269	IVWA
					4-Bromophenylphenyl ether	< .7			UGG	10/22/93	ES	OIL2*269	IVWA
					4-Chloroaniline	< 20			UGG	10/22/93	ES	OIL2*269	IVWA
					4-Chlorophenylphenyl ether	< .7			UGG	10/22/93	ES	OIL2*269	IVWA
					4-Methylphenol / 4-Cresol / p-Cresol	< 5			UGG	10/22/93	ES	OIL2*269	IVWA
					4-Nitroaniline	< 8			UGG	10/22/93	ES	OIL2*269	IVWA
					4-Nitrophenol	< 30			UGG	10/22/93	ES	OIL2*269	IVWA
					9h-carbazole (TIC)	< 2	R		UGG	10/22/93	ES	OIL2*269	IVWA
					Acenaphthene	< .7			UGG	10/22/93	ES	OIL2*269	IVWA
					Acenaphthylene	< .7			UGG	10/22/93	ES	OIL2*269	IVWA
					Aldrin	< 6	R		UGG	10/22/93	ES	OIL2*269	IVWA
					Anthracene	< .7			UGG	10/22/93	ES	OIL2*269	IVWA
					Benzidine	< 20	R		UGG	10/22/93	ES	OIL2*269	IVWA
					Benzo[a]anthracene	< 3			UGG	10/22/93	ES	OIL2*269	IVWA
					Benzo[a]pyrene	< 5			UGG	10/22/93	ES	OIL2*269	IVWA
					Benzo[b]fluoranthene	< 4			UGG	10/22/93	ES	OIL2*269	IVWA
					Benzo[g,h,i]perylene	< 5			UGG	10/22/93	ES	OIL2*269	IVWA
					Benzo[k]fluoranthene	< 1			UGG	10/22/93	ES	OIL2*269	IVWA
					Benzoic acid	< 100	R		UGG	10/22/93	ES	OIL2*269	IVWA
					Benzyl alcohol	< 4			UGG	10/22/93	ES	OIL2*269	IVWA
					Bis (2-chloroethoxy) methane	< 1			UGG	10/22/93	ES	OIL2*269	IVWA
					Bis (2-chloroethyl) ether	< .7			UGG	10/22/93	ES	OIL2*269	IVWA
					Bis (2-chloroisopropyl) ether	< 4			UGG	10/22/93	ES	OIL2*269	IVWA
					Bis (2-ethylhexyl) phthalate	< 10			UGG	10/22/93	ES	OIL2*269	IVWA
					Butylbenzyl phthalate	< 3			UGG	10/22/93	ES	OIL2*269	IVWA
					Chrysene	< 2			UGG	10/22/93	ES	OIL2*269	IVWA
					Di-n-butyl phthalate	< 1			UGG	10/22/93	ES	OIL2*269	IVWA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-049A	0	LM18	20	Di-n-octyl phthalate	< 4			UGG	10/22/93	ES	OIL2*269	IVWA
					Dibenz[A,H]anthracene	< 4			UGG	10/22/93	ES	OIL2*269	IVWA
					Dibenzofuran	< .7			UGG	10/22/93	ES	OIL2*269	IVWA
					Dieldrin	< 6	R		UGG	10/22/93	ES	OIL2*269	IVWA
					Diethyl phthalate	< 5			UGG	10/22/93	ES	OIL2*269	IVWA
					Dimethyl phthalate	< 3			UGG	10/22/93	ES	OIL2*269	IVWA
					Endosulfan sulfate	< 10	R		UGG	10/22/93	ES	OIL2*269	IVWA
					Endrin	< 10	R		UGG	10/22/93	ES	OIL2*269	IVWA
					Endrin aldehyde	< 10	R		UGG	10/22/93	ES	OIL2*269	IVWA
					Endrin ketone	< 10	R		UGG	10/22/93	ES	OIL2*269	IVWA
					Fluoranthene	< 1			UGG	10/22/93	ES	OIL2*269	IVWA
					Fluorene	< .7			UGG	10/22/93	ES	OIL2*269	IVWA
					Heptachlor	< 2	R		UGG	10/22/93	ES	OIL2*269	IVWA
					Heptachlor epoxide	< 6	R		UGG	10/22/93	ES	OIL2*269	IVWA
					Hexachlorobenzene	< .7			UGG	10/22/93	ES	OIL2*269	IVWA
					Hexachlorobutadiene / Hexachloro-1,3-butadiene	< 5			UGG	10/22/93	ES	OIL2*269	IVWA
					Hexachlorocyclopentadiene	< 100			UGG	10/22/93	ES	OIL2*269	IVWA
					Hexachloroethane	< 3			UGG	10/22/93	ES	OIL2*269	IVWA
					Indeno[1,2,3-C,D]pyrene	< 6			UGG	10/22/93	ES	OIL2*269	IVWA
					Isophorone	< .7			UGG	10/22/93	ES	OIL2*269	IVWA
					Lindane / gamma-Benzenehexachloride	< 6	R		UGG	10/22/93	ES	OIL2*269	IVWA
					Methoxychlor	< 6	R		UGG	10/22/93	ES	OIL2*269	IVWA
					N-Nitrosodi-N-propylamine	< 4			UGG	10/22/93	ES	OIL2*269	IVWA
					N-Nitrosodimethylamine	< 2	R		UGG	10/22/93	ES	OIL2*269	IVWA
					Napthalene	< .7			UGG	10/22/93	ES	OIL2*269	IVWA
					Nitrobenzene	< .9			UGG	10/22/93	ES	OIL2*269	IVWA
					PCB 1016	< 20	R		UGG	10/22/93	ES	OIL2*269	IVWA
					PCB 1221	< 20	R		UGG	10/22/93	ES	OIL2*269	IVWA
					PCB 1232	< 20	R		UGG	10/22/93	ES	OIL2*269	IVWA
					PCB 1242	< 20	R		UGG	10/22/93	ES	OIL2*269	IVWA
					PCB 1248	< 40	R		UGG	10/22/93	ES	OIL2*269	IVWA
					PCB 1254	< 40	R		UGG	10/22/93	ES	OIL2*269	IVWA
					PCB 1260	< 60	R		UGG	10/22/93	ES	OIL2*269	IVWA
					Pentachlorophenol	< 30			UGG	10/22/93	ES	OIL2*269	IVWA
					Phenanthrene	< .7			UGG	10/22/93	ES	OIL2*269	IVWA
					Phenol	< 2			UGG	10/22/93	ES	OIL2*269	IVWA
					Pyrene	< .7			UGG	10/22/93	ES	OIL2*269	IVWA
					Toxaphene	< 60	R		UGG	10/22/93	ES	OIL2*269	IVWA
					alpha-Benzenehexachloride /	< 6	R		UGG	10/22/93	ES	OIL2*269	IVWA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration		Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
					alpha-Hexachlorocyclohexane									
BORE	SB-42-049A	0	LM18	20	alpha-Chlordane	<	6	R		UGG	10/22/93	ES	OIL2*269	IVWA
					alpha-Endosulfan / Endosulfan I	<	10	R		UGG	10/22/93	ES	OIL2*269	IVWA
					beta-Benzenehexachloride / beta-Hexachlorocyclohexane	<	6	R		UGG	10/22/93	ES	OIL2*269	IVWA
					beta-Endosulfan / Endosulfan II	<	10	R		UGG	10/22/93	ES	OIL2*269	IVWA
					delta-Benzenehexachloride / delta-Hexachlorocyclohexane	<	6	R		UGG	10/22/93	ES	OIL2*269	IVWA
					gamma-Chlordane	<	6	R		UGG	10/22/93	ES	OIL2*269	IVWA
					n-Nitrosodiphenylamine	<	4			UGG	10/22/93	ES	OIL2*269	IVWA
					p,p-DDD	<	6	R		UGG	10/22/93	ES	OIL2*269	IVWA
					p,p-DDE	<	6	R		UGG	10/22/93	ES	OIL2*269	IVWA
					p,p-DDT	<	6	R		UGG	10/22/93	ES	OIL2*269	IVWA
BORE	SB-42-049A	0	JD19	2	Arsenic		20	D		UGG	10/22/93	ES	OIL2*277	ISGA
BORE	SB-42-049A	0	LM18	20	1,2,4-Trichlorobenzene	<	.8	D		UGG	10/22/93	ES	OIL2*277	IVWA
					1,2-Dichlorobenzene	<	2	D		UGG	10/22/93	ES	OIL2*277	IVWA
					1,2-Diphenylhydrazine	<	2	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					1,3-Dichlorobenzene	<	3	D		UGG	10/22/93	ES	OIL2*277	IVWA
					1,4-Dichlorobenzene	<	2	D		UGG	10/22/93	ES	OIL2*277	IVWA
					2,4,5-Trichlorophenol	<	2	D		UGG	10/22/93	ES	OIL2*277	IVWA
					2,4,6-Trichlorophenol	<	3	D		UGG	10/22/93	ES	OIL2*277	IVWA
					2,4-Dichlorophenol	<	4	D		UGG	10/22/93	ES	OIL2*277	IVWA
					2,4-Dimethylphenol	<	10	D		UGG	10/22/93	ES	OIL2*277	IVWA
					2,4-Dinitrophenol	<	20	D		UGG	10/22/93	ES	OIL2*277	IVWA
					2,4-Dinitrotoluene	<	3	D		UGG	10/22/93	ES	OIL2*277	IVWA
					2,6,10,14-Tetramethylpentadecane (TIC)		5	SD		UGG	10/22/93	ES	OIL2*277	IVWA
					2,6-Dinitrotoluene	<	2	D		UGG	10/22/93	ES	OIL2*277	IVWA
					2-Chloronaphthalene	<	.7	D		UGG	10/22/93	ES	OIL2*277	IVWA
					2-Chlorophenol	<	1	D		UGG	10/22/93	ES	OIL2*277	IVWA
					2-Methyl-4,6-dinitrophenol / 4,6-Dinitro-2-cresol	<	10	D		UGG	10/22/93	ES	OIL2*277	IVWA
					2-Methylnaphthalene	<	1	D		UGG	10/22/93	ES	OIL2*277	IVWA
					2-Methylphenol / 2-cresol	<	.6	D		UGG	10/22/93	ES	OIL2*277	IVWA
					2-Nitroaniline	<	1	D		UGG	10/22/93	ES	OIL2*277	IVWA
					2-Nitrophenol	<	3	D		UGG	10/22/93	ES	OIL2*277	IVWA
					3,3-Dichlorobenzidine	<	100	D		UGG	10/22/93	ES	OIL2*277	IVWA
					3-Methyl-4-chlorophenol / 4-Chloro-m-cresol	<	2	D		UGG	10/22/93	ES	OIL2*277	IVWA
					3-Nitroaniline	<	9	D		UGG	10/22/93	ES	OIL2*277	IVWA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-049A	0	LM18	20	4-Bromophenylphenyl ether	< .7	D		UGG	10/22/93	ES	OIL2*277	IVWA
					4-Chloroaniline	< 20	D		UGG	10/22/93	ES	OIL2*277	IVWA
					4-Chlorophenylphenyl ether	< .7	D		UGG	10/22/93	ES	OIL2*277	IVWA
					4-Methylphenol / 4-Cresol / p-Cresol	< 5	D		UGG	10/22/93	ES	OIL2*277	IVWA
					4-Nitroaniline	< 8	D		UGG	10/22/93	ES	OIL2*277	IVWA
					4-Nitrophenol	< 30	D		UGG	10/22/93	ES	OIL2*277	IVWA
					9h-carbazole (TIC)	< 2	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					Acenaphthene	< .7	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Acenaphthylene	< .7	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Aldrin	< 6	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					Anthracene	< .7	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Benzidine	< 20	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					Benzo[a]anthracene	< 3	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Benzo[a]pyrene	< 5	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Benzo[b]fluoranthene	< 4	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Benzo[g,h,i]perylene	< 5	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Benzo[k]fluoranthene	< 1	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Benzoic acid	< 100	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					Benzyl alcohol	< 4	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Bis (2-chloroethoxy) methane	< 1	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Bis (2-chloroethyl) ether	< .7	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Bis (2-chloroisopropyl) ether	< 4	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Bis (2-ethylhexyl) phthalate	< 10	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Butylbenzyl phthalate	< 3	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Chrysene	< 2	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Di-n-butyl phthalate	< 1	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Di-n-octyl phthalate	< 4	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Dibenz[A,H]anthracene	< 4	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Dibenzofuran	< .7	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Dieldrin	< 6	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					Diethyl phthalate	< 5	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Dimethyl phthalate	< 3	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Endosulfan sulfate	< 10	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					Endrin	< 10	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					Endrin aldehyde	< 10	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					Endrin ketone	< 10	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					Fluoranthene	< 1	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Fluorene	< .7	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Heptachlor	< 2	RD		UGG	10/22/93	ES	OIL2*277	IVWA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration		Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-049A	0	LM18	20	Heptachlor epoxide	<	6	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					Hexachlorobenzene	<	.7	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Hexachlorobutadiene / Hexachloro-1,3-butadiene	<	5	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Hexachlorocyclopentadiene	<	100	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Hexachloroethane	<	3	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Indeno[1,2,3-C,D]pyrene	<	6	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Isophorone	<	.7	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Lindane / gamma-Benzenehexachloride	<	6	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					Methoxychlor	<	6	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					N-Nitrosodi-N-propylamine	<	4	D		UGG	10/22/93	ES	OIL2*277	IVWA
					N-Nitrosodimethylamine	<	2	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					Napthalene	<	.7	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Nitrobenzene	<	.9	D		UGG	10/22/93	ES	OIL2*277	IVWA
					PCB 1016	<	20	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					PCB 1221	<	20	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					PCB 1232	<	20	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					PCB 1242	<	20	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					PCB 1248	<	40	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					PCB 1254	<	40	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					PCB 1260	<	60	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					Pentachlorophenol	<	30	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Phenanthrene	<	.7	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Phenol	<	2	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Pyrene	<	.7	D		UGG	10/22/93	ES	OIL2*277	IVWA
					Toxaphene	<	60	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					Unknown 588 (TIC)		2	SD		UGG	10/22/93	ES	OIL2*277	IVWA
					Unknown 594 (TIC)		7	SD		UGG	10/22/93	ES	OIL2*277	IVWA
					Unknown 630 (TIC)		900	SD		UGG	10/22/93	ES	OIL2*277	IVWA
					alpha-Benzenehexachloride / alpha-Hexachlorocyclohexane	<	6	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					alpha-Chlordane	<	6	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					alpha-Endosulfan / Endosulfan I	<	10	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					beta-Benzenehexachloride / beta-Hexachlorocyclohexane	<	6	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					beta-Endosulfan / Endosulfan II	<	10	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					delta-Benzenehexachloride / delta-Hexachlorocyclohexane	<	6	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					gamma-Chlordane	<	6	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					n-Nitrosodiphenylamine	<	4	D		UGG	10/22/93	ES	OIL2*277	IVWA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
BORE	SB-42-049A	0	LM18	20	p,p-DDD	< 6	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					p,p-DDE	< 6	RD		UGG	10/22/93	ES	OIL2*277	IVWA
					p,p-DDT	< 6	RD		UGG	10/22/93	ES	OIL2*277	IVWA
BORE	SB-BK-007A	0	JD19	2	Arsenic	4			UGG	11/04/93	ES	SOIL2*58	QBGA
BORE	SB-BK-007B	3	JD19	2	Arsenic	3.6			UGG	11/04/93	ES	SOIL2*59	QBGA
BORE	SB-BK-008A	0	JD19	2	Arsenic	8.8			UGG	11/04/93	ES	SOIL2*60	QBGA
BORE	SB-BK-008B	3	JD19	2	Arsenic	7.6			UGG	11/04/93	ES	SOIL2*61	QBGA
BORE	SB-BK-009A	0	JS16	2	Calcium	59000			UGG	11/02/93	ES	OIL2*116	UBGA
BORE	SB-BK-009B	3	JS16	2	Calcium	70000			UGG	11/02/93	ES	OIL2*117	UBGA
BORE	SB-BK-010A	0	JD19	2	Arsenic	13			UGG	11/02/93	ES	OIL2*118	QBEA
BORE	SB-BK-013A	0	JD19	2	Arsenic	7.8			UGG	10/23/93	ES	OIL2*281	ISGA
BORE	SB-BK-013B	3	JS16	10	Calcium	110000			UGG	10/23/93	ES	OIL2*282	HWTA
COMP	SS-42-009	0	JD19	5	Arsenic	50			UGG	10/08/93	ES	OIL2*153	ISEA
COMP	SS-42-010	0	JD19	5	Arsenic	33			UGG	10/08/93	ES	OIL2*154	ISEA
COMP	SS-42-011	0	JD19	5	Arsenic	37			UGG	10/08/93	ES	OIL2*155	ISEA
COMP	SS-42-011	0	JS16	3	Barium	7500			UGG	10/08/93	ES	OIL2*155	HWRA
					Lead	12000			UGG	10/08/93	ES	OIL2*155	HWRA
COMP	SS-42-012	0	JD19	10	Arsenic	77			UGG	10/09/93	ES	OIL2*156	ISEA
COMP	SS-42-013	0	JD19	5	Arsenic	20			UGG	10/09/93	ES	OIL2*157	ISEA
COMP	SS-42-014	0	JD19	5	Arsenic	26			UGG	10/09/93	ES	OIL2*158	ISEA
COMP	SS-42-015	0	JD19	5	Arsenic	27			UGG	10/09/93	ES	OIL2*159	ISEA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
SOIL SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
COMP	SS-42-016	0	JD19	5	Arsenic	52			UGG	10/10/93	ES	OIL2*160	ISEA
COMP	SS-42-016	0	JS16	3	Barium	3200			UGG	10/10/93	ES	OIL2*160	HWRA
COMP	SS-BK-001	0	JD19	5	Arsenic	40			UGG	10/23/93	ES	OIL2*161	QBAA
					Arsenic	38	D		UGG	10/23/93	ES	OIL2*162	QBAA

TOOELE-NORTH RCRA FACILITY INVESTIGATION - PHASE 2
GROUNDWATER SAMPLES DILUTION SUMMARY

Site Type	Site ID	Depth (ft)	Test Method	Dil. Factor	Compound	Concentration	Flag Code	Data Qual	Units	Sample Date	Lab	Lab ID no.	Lot
WELL	N-142-93	377	TT10	50	Chloride	490000		LR	UGL	11/22/93	ES	NWTR2*23	PDFA
WELL	N-142-93	377	TT10	5	Sulfate	1000000		LR	UGL	11/22/93	ES	NWTR2*23	PDFA
WELL	N-142-93	377	TT10	50	Chloride	490000			UGL	02/01/94	ES	NWTR2*70	PDMA
WELL	N-142-93	377	TT10	5	Sulfate	300000			UGL	02/01/94	ES	NWTR2*70	PDMA
WELL	N-142-93	377	TT10	50	Chloride	490000	D		UGL	02/01/94	ES	NWTR2*76	PDMA
WELL	N-142-93	377	TT10	5	Sulfate	300000	D		UGL	02/01/94	ES	NWTR2*76	PDMA
WELL	N-143-93	346	TT10	25	Chloride	550000		LR	UGL	11/23/93	ES	NWTR2*26	PDFA
					Chloride	550000			UGL	02/02/94	ES	NWTR2*72	PDMA
WELL	T-7	322	TT10	25	Chloride	270000		LR	UGL	11/23/93	ES	NWTR2*27	PDFA
					Chloride	270000			UGL	02/02/94	ES	NWTR2*74	PDMA

ATTACHMENT E-13

PERCENT MOISTURE REPORT FOR SOIL SAMPLES

PROJECT NUMBER 79340069G 0201 PROJECT NAME M-W TOOELE NORTH 2
FIELD GROUP TNSOIL2 PROJECT MANAGER R.S. ROBINSON

ST CODE:						70320
OD CODE:						I
PARAMETER:						MOISTURE
UNITS:						%WET WT
FLD.GRP.	#	SAMPLE ID	DATE	TIME	DEPTH(ft)	
TNSOIL2	311	EP-42-001A	05/18/94	14:50	.5	9.2
TNSOIL2	312	EP-42-001B	05/18/94	15:30	7.0	3.6
TNSOIL2	313	EP-42-002A	05/19/94	10:30	3.0	5.1
TNSOIL2	314	EP-42-002B	05/19/94	10:50	6.0	4.2
TNSOIL2	1	SB-20-001A	11/04/93	09:41	0.0	7.9
TNSOIL2	67B	-20-001ADUP	11/04/93	09:41	0.0	7.8
TNSOIL2	2	SB-20-001B	11/04/93	09:52	1.5	7.0
TNSOIL2	3	SB-20-001C	11/04/93	10:04	3.0	5.1
TNSOIL2	4	SB-20-002A	11/02/93	15:53	0.0	7.7
TNSOIL2	5	SB-20-002B	11/02/93	15:56	1.5	4.3
TNSOIL2	6	SB-20-002C	11/02/93	15:59	3.0	3.8
TNSOIL2	7	SB-20-003A	11/02/93	15:11	0.0	8.0
TNSOIL2	8	SB-20-003B	11/02/93	15:30	1.5	5.1
TNSOIL2	9	SB-20-003C	11/02/93	15:37	3.0	4.0
TNSOIL2	10	SB-20-004A	11/03/93	14:57	0.0	6.2
TNSOIL2	11	SB-20-004B	11/03/93	15:02	1.5	7.3
TNSOIL2	12	SB-20-004C	11/03/93	15:08	3.0	6.3
TNSOIL2	13	SB-20-005A	11/02/93	14:19	0.0	6.6
TNSOIL2	14	SB-20-005B	11/02/93	14:28	1.5	3.3
TNSOIL2	15	SB-20-005C	11/02/93	14:30	3.0	3.1
TNSOIL2	16	SB-20-006A	11/02/93	13:37	0.0	4.8
TNSOIL2	17	SB-20-006B	11/02/93	13:42	1.5	2.9
TNSOIL2	18	SB-20-006C	11/02/93	13:56	3.0	3.1
TNSOIL2	19	SB-20-007A	11/03/93	14:19	0.0	4.2
TNSOIL2	20	SB-20-007B	11/03/93	14:25	1.5	4.5
TNSOIL2	21	SB-20-007C	11/03/93	14:33	3.0	4.7
TNSOIL2	22	SB-20-008A	11/04/93	12:03	0.0	4.2
TNSOIL2	23	SB-20-008B	11/04/93	12:09	1.5	6.2
TNSOIL2	24	SB-20-008C	11/04/93	12:21	3.0	4.2
TNSOIL2	25	SB-20-009A	11/04/93	11:29	0.0	5.8
OIL2	26	SB-20-009B	11/04/93	11:36	1.5	4.8
OIL2	27	SB-20-009C	11/04/93	11:41	3.0	5.8
TNSOIL2	28	SB-20-010A	11/04/93	08:25	0.0	7.2
TNSOIL2	29	SB-20-010B	11/04/93	08:28	1.5	7.0
TNSOIL2	30	SB-20-010C	11/04/93	08:34	3.0	5.4
TNSOIL2	31	SB-20-011A	11/03/93	13:48	0.0	4.3
TNSOIL2	32	SB-20-011B	11/03/93	13:52	1.5	6.7
TNSOIL2	33	SB-20-011C	11/03/93	14:00	3.0	6.8
TNSOIL2	34	SB-20-012A	11/03/93	13:22	0.0	6.4
TNSOIL2	65B	-20-012ADUP	11/03/93	13:22	0.0	6.1
TNSOIL2	35	SB-20-012B	11/03/93	13:25	1.5	5.3
TNSOIL2	36	SB-20-012C	11/03/93	13:30	3.0	4.2
TNSOIL2	37	SB-20-013A	11/03/93	12:51	0.0	6.7
TNSOIL2	38	SB-20-013B	11/03/93	12:57	1.5	3.5
TNSOIL2	39	SB-20-013C	11/03/93	13:01	3.0	2.9
TNSOIL2	40	SB-20-014A	11/03/93	12:09	0.0	7.4
TNSOIL2	64B	-20-014ADUP	11/03/93	12:09	0.0	7.1
TNSOIL2	41	SB-20-014B	11/03/93	12:20	1.5	3.6
TNSOIL2	42	SB-20-014C	11/03/93	12:27	3.0	3.0
TNSOIL2	43	SB-20-015A	11/03/93	11:30	0.0	7.1
TNSOIL2	63B	-20-015ADUP	11/03/93	11:30	0.0	7.3
TNSOIL2	44	SB-20-015B	11/03/93	11:34	1.5	5.8
TNSOIL2	45	SB-20-015C	11/03/93	11:45	3.0	3.6
TNSOIL2	46	SB-20-016A	11/04/93	10:37	0.0	5.2
TNSOIL2	47	SB-20-016B	11/04/93	10:53	1.5	7.9
TNSOIL2	48	SB-20-016C	11/04/93	11:10	3.0	7.4
TNSOIL2	49	SB-20-017A	11/04/93	09:00	0.0	7.1
TNSOIL2	50	SB-20-017B	11/04/93	09:05	1.5	7.9
TNSOIL2	66B	-20-017BDUP	11/04/93	09:05	1.5	7.7
TNSOIL2	51	SB-20-017C	11/04/93	09:09	3.0	7.4
TNSOIL2	52	SB-20-018A	11/03/93	09:36	0.0	6.7
TNSOIL2	53	SB-20-018B	11/03/93	09:40	1.5	3.8
TNSOIL2	54	SB-20-018C	11/03/93	09:50	3.0	2.8
TNSOIL2	55	SB-20-019A	11/02/93	13:00	0.0	6.2
OIL2	62B	-20-019ADUP	11/02/93	13:00	0.0	4.8
TNSOIL2	56	SB-20-019B	11/02/93	13:05	1.5	3.8
TNSOIL2	57	SB-20-019C	11/02/93	13:11	3.0	3.4
TNSOIL2	70	SB-34-001A	10/26/93	09:45	0.0	7.2

PROJECT NUMBER 7934069G 0201 PROJECT NAME M-W TOOELE NORTH 2
FIELD GROUP TNSOIL2 PROJECT MANAGER R.S. ROBINSON

ET CODE:					70320	
OD CODE:					I	
PARAMETER:					MOISTURE	
UNITS:					%WET WT	
FLD.GRP.	#	SAMPLE ID	DATE	TIME	DEPTH (FT)	
TNSOIL2	115	B-34-001ADUP	10/26/93	09:45	0.0	7.0
TNSOIL2	71	SB-34-001B	10/26/93	10:55	6.0	<0.5
TNSOIL2	72	SB-34-001C	10/26/93	12:40	10.0	4.0
TNSOIL2	73	SB-34-001D	10/26/93	13:25	15.0	7.2
TNSOIL2	74	SB-34-001E	10/26/93	13:52	20.0	4.5
TNSOIL2	75	SB-34-002A	10/28/93	08:42	0.0	6.7
TNSOIL2	76	SB-34-002B	10/28/93	09:15	5.0	7.1
TNSOIL2	78	SB-34-002D	10/28/93	15:55	15.0	4.8
TNSOIL2	80	SB-34-003A	10/27/93	09:00	0.0	11.2
TNSOIL2	81	SB-34-003B	10/27/93	09:12	5.0	9.8
TNSOIL2	82	SB-34-003C	10/27/93	12:09	11.0	3.7
TNSOIL2	83	SB-34-003D	10/27/93	14:15	15.0	3.5
TNSOIL2	84	SB-34-003E	10/27/93	15:06	20.0	3.3
TNSOIL2	85	SB-34-004A	10/24/93	13:13	0.0	6.4
TNSOIL2	86	SB-34-004B	10/24/93	13:17	1.5	10.6
TNSOIL2	87	SB-34-004C	10/24/93	13:27	3.0	5.3
TNSOIL2	88	SB-34-005A	10/24/93	13:46	0.0	8.1
TNSOIL2	89	SB-34-005B	10/24/93	13:53	1.5	7.0
TNSOIL2	90	SB-34-005C	10/24/93	13:57	3.0	8.1
TNSOIL2	91	SB-34-006A	10/24/93	14:16	0.0	7.4
TNSOIL2	92	SB-34-006B	10/24/93	14:20	1.5	9.1
TNSOIL2	93	SB-34-006C	10/24/93	14:24	3.0	6.6
TNSOIL2	94	SB-34-007A	10/25/93	10:16	0.0	5.4
TNSOIL2	95	SB-34-007B	10/25/93	10:28	1.5	5.4
TNSOIL2	96	SB-34-007C	10/25/93	10:35	3.0	5.6
TNSOIL2	97	SB-34-008A	10/25/93	11:00	0.0	5.6
TNSOIL2	98	SB-34-008B	10/25/93	11:10	1.5	4.9
TNSOIL2	112	B-34-008BDUP	10/25/93	11:10	1.5	4.9
TNSOIL2	99	SB-34-008C	10/25/93	11:15	3.0	4.2
TNSOIL2	100	SB-34-009A	10/25/93	11:35	0.0	9.8
OIL2	113	B-34-009ADUP	10/25/93	11:35	0.0	10.0
OIL2	101	SB-34-009B	10/25/93	11:40	1.5	9.9
TNSOIL2	102	SB-34-009C	10/25/93	12:15	3.0	4.9
TNSOIL2	103	SB-34-010A	10/25/93	13:40	0.0	6.4
TNSOIL2	104	SB-34-010B	10/25/93	13:42	1.5	11.2
TNSOIL2	105	SB-34-010C	10/25/93	13:44	3.0	8.4
TNSOIL2	106	SB-34-011A	10/25/93	14:04	0.0	6.5
TNSOIL2	107	SB-34-011B	10/25/93	14:06	1.5	11.0
TNSOIL2	108	SB-34-011C	10/25/93	14:06	3.0	8.7
TNSOIL2	109	SB-34-012A	10/25/93	14:32	0.0	9.9
TNSOIL2	110	SB-34-012B	10/25/93	14:35	1.5	12.8
TNSOIL2	114	SB-34-012B	10/25/93	14:35	1.5	12.6
TNSOIL2	111	SB-34-012C	10/25/93	14:40	3.0	8.7
TNSOIL2	129	SB-37-001A	10/06/93	12:02	0.0	1.0
TNSOIL2	130	SB-37-001B	10/06/93	12:07	1.5	2.2
TNSOIL2	131	SB-37-001C	10/06/93	12:11	3.0	2.6
TNSOIL2	132	SB-37-002A	10/06/93	12:25	0.0	2.1
TNSOIL2	133	SB-37-002B	10/06/93	12:31	1.5	3.1
TNSOIL2	134	SB-37-002C	10/06/93	12:40	3.0	5.6
TNSOIL2	135	SB-37-003A	10/06/93	13:09	0.0	1.8
TNSOIL2	136	SB-37-003B	10/06/93	13:13	1.5	3.7
TNSOIL2	137	SB-37-003C	10/06/93	13:23	3.0	2.9
TNSOIL2	138	SB-37-004A	10/06/93	13:40	0.0	1.6
TNSOIL2	139	SB-37-004B	10/06/93	13:44	1.5	2.6
TNSOIL2	140	SB-37-004C	10/06/93	13:47	3.0	3.7
TNSOIL2	141	SB-37-005A	10/06/93	14:07	0.0	1.7
TNSOIL2	142	SB-37-005B	10/06/93	14:11	1.5	3.0
TNSOIL2	143	SB-37-005C	10/06/93	14:16	3.0	3.0
TNSOIL2	144	SB-37-006A	10/06/93	14:33	0.0	1.9
TNSOIL2	151	B-37-006ADUP	10/06/93	14:33	0.0	1.9
TNSOIL2	145	SB-37-006B	10/06/93	14:39	1.5	4.1
TNSOIL2	146	SB-37-006C	10/06/93	14:57	3.0	3.7
TNSOIL2	152	B-37-006CDUP	10/06/93	14:57	3.0	3.7
TNSOIL2	287	SB-37-007A	11/09/93	10:10	0.0	3.9
OIL2	288	SB-37-007B	11/09/93	10:17	1.5	3.2
TNSOIL2	289	SB-37-007C	11/09/93	10:27	3.0	3.7
TNSOIL2	163	SB-42-014A	11/03/93	10:45	12.0	2.6
TNSOIL2	164	SB-42-014B	11/03/93	11:30	37.0	14.7

PROJECT NUMBER 7934069G 0201 PROJECT NAME M-W TOOELE NORTH 2
FIELD GROUP TNSOIL2 PROJECT MANAGER R.S. ROBINSON

[redacted]T CODE:						70320	
[redacted]D CODE:						I	
PARAMETER:						MOISTURE	
UNITS:						%WET WT	
FLD.GRP.	#	SAMPLE ID	DATE	TIME	DEPTH (ft)		
TNSOIL2	290	B-42-014BDUP	11/03/93	11:30	37.0	15.4	
TNSOIL2	165	SB-42-014C	11/03/93	12:30	42.0	21.8	
TNSOIL2	166	SB-42-014D	11/03/93	14:15	82.0	9.3	
TNSOIL2	167	SB-42-014E	11/03/93	15:30	97.0	16.2	
TNSOIL2	168	SB-42-015A	11/05/93	08:15	17.0	5.8	
TNSOIL2	291	B-42-015ADUP	11/05/93	08:15	17.0	5.0	
TNSOIL2	169	SB-42-015B	11/05/93	09:00	37.0	20.5	
TNSOIL2	170	SB-42-015C	11/05/93	09:20	47.0	21.6	
TNSOIL2	171	SB-42-015D	11/05/93	10:40	77.0	11.2	
TNSOIL2	172	SB-42-015E	11/05/93	12:15	102.0	2.5	
TNSOIL2	173	SB-42-016A	11/05/93	14:00	7.0	3.7	
TNSOIL2	174	SB-42-016B	11/05/93	15:00	27.0	4.5	
TNSOIL2	175	SB-42-016C	11/05/93	15:30	42.0	21.8	
TNSOIL2	176	SB-42-016D	11/08/93	09:00	77.0	18.5	
TNSOIL2	177	SB-42-016E	11/08/93	10:40	102.0	4.1	
TNSOIL2	178	SB-42-017A	11/08/93	12:25	2.0	27.4	
TNSOIL2	179	SB-42-017B	11/08/93	13:35	32.0	16.6	
TNSOIL2	180	SB-42-017C	11/08/93	13:50	37.0	22.7	
TNSOIL2	292	B-42-017CDUP	11/08/93	13:50	37.0	21.9	
TNSOIL2	181	SB-42-017D	11/08/93	15:15	67.0	17.2	
TNSOIL2	182	SB-42-017E	11/08/93	17:00	92.0	15.7	
TNSOIL2	183	SB-42-018A	10/13/93	15:29	0.0	5.4	
TNSOIL2	271	B-42-018ADUP	10/13/93	15:29	0.0	4.4	
TNSOIL2	184	SB-42-018B	10/13/93	16:00	5.0	1.7	
TNSOIL2	185	SB-42-018C	10/13/93	16:17	7.0	2.2	
TNSOIL2	186	SB-42-018D	10/13/93	16:35	10.0	3.2	
TNSOIL2	187	SB-42-019A	10/13/93	12:47	0.0	5.2	
TNSOIL2	188	SB-42-019B	10/13/93	13:05	4.0	2.4	
TNSOIL2	189	SB-42-019C	10/13/93	14:15	9.0	2.7	
TNSOIL2	190	SB-42-019D	10/13/93	14:25	10.0	2.6	
[redacted]IL2	191	SB-42-020A	10/13/93	09:10	0.0	5.1	
[redacted]IL2	192	SB-42-020B	10/13/93	09:20	4.0	4.1	
TNSOIL2	193	SB-42-020C	10/13/93	10:00	7.0	4.4	
TNSOIL2	194	SB-42-020D	10/13/93	10:30	10.0	5.1	
TNSOIL2	195	SB-42-021A	10/13/93	11:40	0.0	6.7	
TNSOIL2	196	SB-42-021B	10/13/93	11:52	4.0	4.1	
TNSOIL2	272	B-42-021BDUP	10/13/93	11:52	4.0	3.8	
TNSOIL2	197	SB-42-021C	10/13/93	12:19	7.0	4.4	
TNSOIL2	198	SB-42-021D	10/13/93	12:45	10.0	4.8	
TNSOIL2	199	SB-42-022A	10/13/93	13:35	0.0	8.5	
TNSOIL2	200	SB-42-022B	10/13/93	13:50	3.0	8.3	
TNSOIL2	201	SB-42-022C	10/13/93	14:56	5.0	4.1	
TNSOIL2	202	SB-42-022D	10/13/93	15:30	10.0	4.7	
TNSOIL2	203	SB-42-023A	10/14/93	08:45	0.0	6.3	
TNSOIL2	204	SB-42-023B	10/14/93	09:00	4.0	7.9	
TNSOIL2	205	SB-42-023C	10/14/93	10:14	7.0	4.2	
TNSOIL2	206	SB-42-023D	10/14/93	10:58	10.0	5.2	
TNSOIL2	207	SB-42-024A	10/14/93	11:18	0.0	5.0	
TNSOIL2	208	SB-42-024B	10/14/93	11:40	4.0	3.4	
TNSOIL2	209	SB-42-024C	10/14/93	12:15	7.0	1.8	
TNSOIL2	210	SB-42-024D	10/14/93	13:21	10.0	3.3	
TNSOIL2	211	SB-42-025A	10/14/93	14:23	0.0	6.1	
TNSOIL2	212	SB-42-025B	10/14/93	14:30	3.5	4.9	
TNSOIL2	213	SB-42-025C	10/14/93	15:10	7.0	2.8	
TNSOIL2	214	SB-42-025D	10/14/93	15:44	10.0	3.5	
TNSOIL2	273	SB-42-025DUP	10/14/93	15:44	10.0	4.0	
TNSOIL2	215	SB-42-026A	10/19/93	10:55	0.0	10.0	
TNSOIL2	216	SB-42-026B	10/19/93	11:15	4.0	2.8	
TNSOIL2	217	SB-42-026C	10/19/93	11:55	7.6	2.0	
TNSOIL2	218	SB-42-026D	10/19/93	12:18	10.0	2.4	
TNSOIL2	219	SB-42-027A	10/19/93	12:50	0.0	8.0	
TNSOIL2	220	SB-42-027B	10/19/93	13:30	6.0	3.1	
TNSOIL2	221	SB-42-027C	10/19/93	13:49	8.0	3.3	
[redacted]OIL2	222	SB-42-027D	10/19/93	13:57	10.0	3.6	
[redacted]IL2	274	SB-42-027DUP	10/19/93	13:57	10.0	3.7	
TNSOIL2	223	SB-42-028A	10/19/93	14:30	0.0	9.6	
TNSOIL2	224	SB-42-028B	10/19/93	14:40	3.0	2.4	
TNSOIL2	225	SB-42-028C	10/19/93	15:25	7.0	3.3	

PROJECT NUMBER 7934069G 0201 PROJECT NAME M-W TOOELE NORTH 2
FIELD GROUP TNSOIL2 PROJECT MANAGER R.S. ROBINSON

[illegible]ET CODE:						70320
[illegible]OD CODE:						I
PARAMETER:						MOISTURE
UNITS:						%WET WT
FLD.GRP.	#	SAMPLE ID	DATE	TIME	DEPTH(ft)	
TNSOIL2	226	SB-42-028D	10/19/93	15:55	10.0	4.0
TNSOIL2	227	SB-42-029A	10/19/93	16:45	0.0	9.4
TNSOIL2	228	SB-42-029B	10/19/93	16:50	3.5	3.8
TNSOIL2	229	SB-42-029C	10/19/93	17:00	7.0	3.8
TNSOIL2	230	SB-42-029D	10/19/93	17:25	10.0	4.0
TNSOIL2	231	SB-42-030A	10/20/93	09:33	0.0	8.7
TNSOIL2	232	SB-42-030B	10/20/93	09:50	5.0	2.9
TNSOIL2	233	SB-42-031A	10/20/93	10:35	0.0	11.0
TNSOIL2	234	SB-42-031B	10/20/93	11:15	5.0	2.9
TNSOIL2	235	SB-42-032A	10/20/93	11:43	0.0	8.9
TNSOIL2	236	SB-42-032B	10/20/93	12:08	5.0	2.5
TNSOIL2	237	SB-42-033A	10/20/93	13:15	0.0	7.7
TNSOIL2	275	B-42-033ADUP	10/20/93	13:15	0.0	7.3
TNSOIL2	238	SB-42-033B	10/20/93	13:32	5.0	2.1
TNSOIL2	239	SB-42-034A	10/20/93	14:05	0.0	7.4
TNSOIL2	240	SB-42-034B	10/20/93	14:25	5.0	2.7
TNSOIL2	241	SB-42-035A	10/21/93	09:00	0.0	9.6
TNSOIL2	242	SB-42-035B	10/21/93	10:22	5.0	4.4
TNSOIL2	243	SB-42-036A	10/21/93	11:10	0.0	8.1
TNSOIL2	244	SB-42-036B	10/21/93	12:55	5.0	3.0
TNSOIL2	245	SB-42-037A	10/21/93	13:25	0.0	11.6
TNSOIL2	276	B-42-037ADUP	10/21/93	13:25	0.0	11.4
TNSOIL2	246	SB-42-037B	10/21/93	13:32	5.0	4.9
TNSOIL2	247	SB-42-038A	10/21/93	13:58	0.0	9.9
TNSOIL2	248	SB-42-038B	10/21/93	14:23	5.0	3.9
TNSOIL2	249	SB-42-039A	10/21/93	15:20	0.0	7.8
TNSOIL2	250	SB-42-039B	10/21/93	15:50	5.0	3.8
TNSOIL2	251	SB-42-040A	10/22/93	09:17	0.0	8.8
TNSOIL2	252	SB-42-040B	10/22/93	09:27	5.0	7.0
TNSOIL2	253	SB-42-041A	10/22/93	10:13	0.0	7.8
[illegible]OIL2	254	SB-42-041B	10/22/93	10:30	5.0	4.1
[illegible]OIL2	255	SB-42-042A	10/22/93	11:10	0.0	9.8
TNSOIL2	256	SB-42-042B	10/22/93	11:19	5.0	5.6
TNSOIL2	257	SB-42-043A	10/22/93	11:53	0.0	10.9
TNSOIL2	258	SB-42-043B	10/22/93	12:04	5.0	6.0
TNSOIL2	259	SB-42-044A	10/22/93	14:23	0.0	8.3
TNSOIL2	260	SB-42-044B	10/22/93	15:02	5.0	2.7
TNSOIL2	261	SB-42-045A	10/23/93	08:48	0.0	7.5
TNSOIL2	262	SB-42-045B	10/23/93	08:58	5.0	5.2
TNSOIL2	263	SB-42-046A	10/23/93	09:30	0.0	9.8
TNSOIL2	264	SB-42-046B	10/23/93	09:43	5.0	4.8
TNSOIL2	265	SB-42-047A	10/23/93	10:08	0.0	12.0
TNSOIL2	266	SB-42-047B	10/23/93	10:17	5.0	9.1
TNSOIL2	267	SB-42-048A	10/22/93	13:08	0.0	7.9
TNSOIL2	268	SB-42-048B	10/22/93	13:14	5.0	7.5
TNSOIL2	269	SB-42-049A	10/22/93	13:41	0.0	14.2
TNSOIL2	277	B-42-049ADUP	10/22/93	13:41	0.0	15.7
TNSOIL2	270	SB-42-049B	10/22/93	13:53	5.0	8.4
TNSOIL2	315	SB-42-050A	05/31/94	14:00	0.5	6.6
TNSOIL2	319	B-42-050ADUP	05/31/94	14:00	0.5	9.2
TNSOIL2	316	SB-42-050B	05/31/94	14:30	1.0	9.3
TNSOIL2	317	SB-42-051A	05/31/94	16:00	0.5	6.5
TNSOIL2	318	SB-42-051B	05/31/94	16:20	2.0	6.9
TNSOIL2	320	SB-45-002A	05/23/94	11:35	8.0	9.6
TNSOIL2	321	SB-45-002B	05/23/94	12:15	12.0	3.1
TNSOIL2	322	SB-45-003A	05/23/94	14:20	8.0	4.1
TNSOIL2	323	SB-45-003B	05/23/94	15:00	10.0	4.9
TNSOIL2	324	SB-45-004A	05/26/94	13:00	6.5	3.1
TNSOIL2	325	SB-45-004B	05/26/94	13:20	9.0	7.4
TNSOIL2	326	SB-45-005A	05/24/94	13:50	12.0	2.3
TNSOIL2	328	SB-45-006A	05/25/94	09:10	10.0	3.4
TNSOIL2	329	SB-45-006B	05/25/94	09:30	11.5	4.9
TNSOIL2	330	SB-45-007A	05/25/94	11:20	10.5	13.2
TNSOIL2	331	SB-45-007B	05/25/94	12:00	12.0	3.9
[illegible]IL2	360	B-45-007BDUP	05/25/94	12:00	12.0	13.3
[illegible]OIL2	332	SB-45-008A	05/25/94	13:45	7.0	3.8
TNSOIL2	361	B-45-008ADUP	05/25/94	13:45	7.0	4.3
TNSOIL2	333	SB-45-008B	05/25/94	14:10	10.0	5.0

PROJECT NUMBER 7934069G 0201 PROJECT NAME M-W TOOELE NORTH 2
FIELD GROUP TNSOIL2 PROJECT MANAGER R.S. ROBINSON

[illegible]T CODE:						70320
[illegible]D CODE:						I
PARAMETER:						MOISTURE
UNITS:						%WET WT
FLD.GRP.	#	SAMPLE ID	DATE	TIME	DEPTH(ft)	
TNSOIL2	334	SB-45-009A	05/25/94	15:15	8.0	2.9
TNSOIL2	335	SB-45-009B	05/25/94	15:40	11.0	3.2
TNSOIL2	336	SB-45-010A	05/26/94	09:30	7.0	6.2
TNSOIL2	338	SB-45-011A	05/27/94	15:05	9.0	4.5
TNSOIL2	339	SB-45-011B	05/27/94	15:30	10.5	3.5
TNSOIL2	340	SB-45-012A	06/01/94	10:20	8.5	3.1
TNSOIL2	369	SB-45-012A	06/09/94	11:15	8.0	3.4
TNSOIL2	375	B-45-012ADUP	06/09/94	11:15	8.0	3.1
TNSOIL2	341	SB-45-012B	06/01/94	11:00	10.5	2.5
TNSOIL2	370	SB-45-012B	06/09/94	11:25	10.0	3.1
TNSOIL2	342	SB-45-013A	06/01/94	13:20	7.0	7.0
TNSOIL2	371	SB-45-013A	06/09/94	12:15	7.0	7.2
TNSOIL2	363	B-45-013ADUP	06/01/94	13:20	7.0	9.4
TNSOIL2	343	SB-45-013B	06/01/94	14:00	9.0	4.5
TNSOIL2	372	SB-45-013B	06/09/94	12:25	9.0	4.4
TNSOIL2	344	SB-45-014A	06/01/94	16:20	9.0	4.5
TNSOIL2	373	SB-45-014A	06/09/94	13:35	8.5	8.1
TNSOIL2	345	SB-45-014B	06/01/94	17:20	10.5	21.6
TNSOIL2	374	SB-45-014B	06/09/94	13:50	10.5	7.6
TNSOIL2	346	SB-45-015A	06/08/94	14:00	8.0	10.0
TNSOIL2	365	SB-48-001A	05/27/94	08:10	4.0	13.2
TNSOIL2	362	B-48-001ADUP	05/27/94	08:10	4.0	14.0
TNSOIL2	385	SB-48-001B	06/09/94	10:00	9.5	2.6
TNSOIL2	367	SB-48-002A	05/27/94	10:05	3.5	8.2
TNSOIL2	368	SB-48-002B	05/27/94	10:45	10.0	2.6
TNSOIL2	58	SB-BK-007A	11/04/93	12:52	0.0	5.3
TNSOIL2	59	SB-BK-007B	11/04/93	12:56	3.0	2.3
TNSOIL2	60	SB-BK-008A	11/04/93	13:40	0.0	6.0
TNSOIL2	61	SB-BK-008B	11/04/93	13:52	3.0	3.0
TNSOIL2	116	SB-BK-009A	11/02/93	10:18	0.0	8.4
[illegible]IL2	117	SB-BK-009B	11/02/93	10:27	3.0	2.6
[illegible]IL2	118	SB-BK-010A	11/02/93	10:49	0.0	5.3
TNSOIL2	119	SB-BK-010B	11/02/93	11:10	3.0	6.4
TNSOIL2	147	SB-BK-011A	10/06/93	10:16	0.0	1.6
TNSOIL2	148	SB-BK-011B	10/06/93	10:30	3.0	3.0
TNSOIL2	149	SB-BK-012A	10/06/93	10:55	0.0	1.8
TNSOIL2	150	SB-BK-012B	10/06/93	11:08	3.0	3.2
TNSOIL2	281	SB-BK-013A	10/23/93	10:54	0.0	8.6
TNSOIL2	282	SB-BK-013B	10/23/93	10:58	3.0	3.3
TNSOIL2	283	SB-BK-014A	10/23/93	11:30	0.0	11.6
TNSOIL2	284	SB-BK-014B	10/23/93	11:36	3.0	4.9
TNSOIL2	285	SB-BK-015A	10/23/93	12:32	0.0	10.4
TNSOIL2	286	SB-BK-015B	10/23/93	12:37	3.0	1.9
TNSOIL2	68	SD-21-001	10/07/93	10:30	0.0	47.6
TNSOIL2	69	SD-21-002	10/07/93	10:37	0.0	45.8
TNSOIL2	120	SS-37-013	10/05/93	15:00	0.0	1.1
TNSOIL2	121	SS-37-014	10/05/93	15:15	0.0	0.7
TNSOIL2	128	SS-37-014DUP	10/05/93	18:00	0.0	0.7
TNSOIL2	122	SS-37-015	10/05/93	15:30	0.0	0.8
TNSOIL2	123	SS-37-016	10/05/93	15:45	0.0	0.6
TNSOIL2	124	SS-37-017	10/05/93	16:00	0.0	0.6
TNSOIL2	125	SS-37-018	10/05/93	16:15	0.0	0.7
TNSOIL2	126	SS-37-019	10/05/93	16:20	0.0	0.6
TNSOIL2	127	SS-37-020	10/05/93	16:30	0.0	0.6
TNSOIL2	153	SS-42-009	10/08/93	12:30	0.0	0.9
TNSOIL2	154	SS-42-010	10/08/93	15:45	0.0	1.1
TNSOIL2	155	SS-42-011	10/08/93	17:20	0.0	2.8
TNSOIL2	156	SS-42-012	10/09/93	09:00	0.0	0.8
TNSOIL2	157	SS-42-013	10/09/93	12:15	0.0	0.9
TNSOIL2	158	SS-42-014	10/09/93	15:20	0.0	0.8
TNSOIL2	159	SS-42-015	10/09/93	16:15	0.0	1.3
TNSOIL2	160	SS-42-016	10/10/93	13:39	0.0	1.5
TNSOIL2	161	SS-BK-001	10/23/93	10:49	0.0	8.1
TNSOIL2	162	SS-BK-001DUP	10/23/93	10:49	0.0	8.5

ATTACHMENT E-14

LABORATORY INSTRUMENT CALIBRATION FREQUENCY

ATTACHMENT E-14

CALIBRATION FREQUENCY SUMMARY
(Page 1 of 3)

Analysis	Method	Calibration Technique	Frequency
VOCs (GC/MS)	UM20	Calibration Curve	
		Continuing Calibration Checks	
		Reference Standard	
VOCs (GC)	LO02	Calibration Curve	Beginning of each analysis or as continuing calibration fails
		Continuing Calibration Checks	Beginning and end of each day
		Reference Standard	End of each analysis
SVOCs	LM18 UM18	DFTPP Sensitivity	Daily
		Calibration Curve	As continuing calibration fails
		Continuing Calibration Checks	Beginning and end of each day
		Reference Standard	
OC Pesticides	LH10 UH02	Calibration Curve (5 point)	As continuing calibration fails
		Continuing Calibration Checks	Beginning and end of each day
		Reference Standard	Weekly
Explosives	UW32 LW12	Calibration Curve	Every seven lots or as continuing calibration fails
		Continuing Calibration Checks	Beginning and end of each run
		Reference Standard	
TPH as gas and diesel	modified EPA 8015	Calibration Curve	Daily
		Continuing Calibration Checks	
		Reference Standard	

ATTACHMENT E-14

CALIBRATION FREQUENCY SUMMARY
(Page 2 of 3)

Analysis	Method	Calibration Technique	Frequency

ATTACHMENT E-14

CALIBRATION FREQUENCY SUMMARY
(Page 3 of 3)

Analysis	Method	Calibration Technique	Frequency
ICP Metals	JS11 SS10	Calibration Curve (2 point)	Daily
		Continuing Calibration Checks	Every 10 samples and end of day (high-level standard)
		Reference Standard	Beginning and end of each run
GFAA Metals	JD19 JD15 SD22 SD20 SD21 SD23 SD09	Calibration Curve (GFAA - 3 point)	Daily
		Continuing Calibration Checks	Every 10 samples and end of day (mid-level standard)
		Reference Standard	Beginning and end of each run
Mercury	JB01 SB01	Calibration Curve (GFAA - 3 point)	Daily
		Continuing Calibration Checks	Every 10 samples and end of day (mid-level standard)
		Reference Standard	Beginning and end of each run
Water Quality Parameters		Calibration Curve	
Sulfate and Chloride Alkalinity Total Dissolved Solids	TT10 EPA 310.1 EPA106.1	Continuing Calibration Checks	
		Reference Standard	

ATTACHMENT E-15

LABORATORY EXTRACTION DATA SHEETS

SAMPLE: TA3011-2 x 287-289, 288 MSD/MS Sand Blk
Thama Blk

FRACTION OF SAMPLE: SS

LM 18 CHECKLIST SVOCs

Extraction solvent: Methylene Chloride.

DLC/CDG

1. Soxhlets with MeCl2 cleaned glasswool cleaned for 1 hour ✓
2. Weigh out 15g of sample ✓
3. Add enough MeCl2 cleaned and baked Na2SO4 to dry (sample should have a sandy texture) ✓
4. All samples spiked with 1.0ml NON-CLP surrogate 50\100 BN\ACID ✓
   If a MS\MSD is needed 1.0ml NON-CLP Matrix spike 50\100 BN\ACID ✓ DLC 11-13-93
5. Extract for minimum of 8hours time on 11.12.93 1:00pm time off 8:00AM ✓ DLC 11-12-93
6. Check out lot folder ✓ DLC 11-13-93
7. Concentrate to 10mls at 65-70 degrees C ✓
8. Concentrate to 0.5mls at 65-70 degrees C BMD 11-15-93
9. Bring to 1.0ml MeCL2 in auto sample vials ✓
10. Check lot folder off of clipboard ,turn into GCMS ✓

QC REQUIRED	YES	NO
THAMA BLK	✓	
Sand ~~RMA~~ BLK	✓	
MS	✓	
MSD	✓	

MeCl2 LOT# BF119

Chain of Custody	TO HOOD LAB D DLC 11-12-93	TO Fridge 26 DLC 11-13-93	From 26 to 9 BMD 11-15-93

SAMPLE: TA3014-2 x 287-289, 288 MSD/MS, Sand Blk
Thama Blk

FRACTION OF SAMPLE: SS

LM 18 CHECKLIST SVOCs

Extraction solvent: Methylene Chloride.

DLC/CDG ✓

1. Soxhlets with MeCl2 cleaned glasswool cleaned for 1 hour ✓
2. Weigh out 15g of sample ✓
3. Add enough MeCl2 cleaned and baked Na2SO4 to dry (sample should have a sandy texture) ✓
4. All samples spiked with 1.0ml NON-CLP surrogate 50\100 BN\ACID ✓
   If a MS\MSD is needed 1.0ml NON-CLP Matrix spike 50\100 BN\ACID ✓ DLC 11-13-93
5. Extract for minimum of 8hours time on 11-12-93 1:00pm time off 8:00AM ✓ DLC 11-12-93
6. Check out lot folder ✓ DLC 11-13-93
7. Concentrate to 10mls at 65-70 degrees C ✓
8. Concentrate to 0.5mls at 65-70 degrees C BMD 11-15-93
9. Bring to 1.0ml MeCL2 in auto sample vials ✓
10. Check lot folder off of clipboard ,turn into GCMS ✓

QC REQUIRED	YES	NO
THAMA BLK	✓	
Sand ~~RMA~~ BLK	✓	
MS	✓	
MSD	✓	

MeCl2 LOT# BF119

Chain of Custody	To HOOD LAB D DLC 11-12-93	To Fridge 26 DLC 11-13-93	Hom26404 BMD 11-15-93

SAMPLE: TNSOIL2 * 267-270, 277, 270 MS/MD, BLK

FRACTION OF SAMPLE: SS

LM 18 CHECKLIST SVOCs

Extraction solvent: Methylene Chloride.

1. Soxhlets with MeCl2 cleaned glasswool cleaned for 1 hour — CAG 10-26-93
2. Weigh out 15g of sample
3. Add enough MeCl2 cleaned and baked Na2SO4 to dry (sample should have a sandy texture)
4. All samples spiked with 1.0ml NON-CLP surrogate 50\100 BN\ACID
   If a MS\MSD is needed 1.0ml NON-CLP Matrix spike 50\100 BN\ACID
5. Extract for minimum of 8hours — time on 4:30PM time off 7:00 AM 10-27-93 CAG
6. Check out lot folder — JSC 10-26-93
7. Concentrate to 10mls at 65-70 degrees C — CAG 10-27-93
8. Concentrate to 0.5mls at 65-70 degrees C — AT 10/31/93
9. Bring to 1.0ml MeCL2 in auto sample vials
10. Check lot folder off of clipboard ,turn into GCMS

QC REQUIRED	YES	NO
THAMA BLK		
RMA BLK	✓	
MS	✓	
MSD		

MeCl2 LOT#

Chain of Custody	TO HOODS 10-26-93 CAG	To Fridge 10-27-93 CAG	to GCMS AT 10/31/93

SAMPLE: TN5012* 120-136

FRACTION OF SAMPLE: SS

LM 18 CHECKLIST SVOCs

Extraction solvent: Methylene Chloride.

1. Soxhlets with MeCl2 cleaned glasswool cleaned for 1 hour — TM 10/12/93
2. Weigh out 15g of sample
3. Add enough MeCl2 cleaned and baked Na2SO4 to dry (sample should have a sandy texture)
4. All samples spiked with 1.0ml NON-CLP surrogate 50\100 BN\ACID — WI FF 10/13
   If a MS\MSD is needed 1.0ml NON-CLP Matrix spike 50\100 BN\ACID
5. Extract for minimum of 8hours time on 5:30 time off ~~8:00 AM~~ 8:00 AM 10/13/93
6. Check out lot folder — FF 10/13/93
7. Concentrate to 10mls at 65-70 degrees C — BMD 10-08-93
8. Concentrate to 0.5mls at 65-70 degrees C
9. Bring to 1.0ml MeCL2 in auto sample vials
10. Check lot folder off of clipboard ,turn into GCMS

QC REQUIRED	YES	NO
		✓
THAMA BLK	✓	
RMA BLK		✓
MS		✓
MSD		

MeCl2 LOT# BG009

Chain of Custody	To Hood TM 10/12/93	In fridge (5) FF 10/13/93	Rem 2 to GCMS BMD 10-18-93

SAMPLE: TNSoil2 * 137- 146, 151, 152

FRACTION OF SAMPLE: SS

LM 18 CHECKLIST SVOCs

Extraction solvent: Methylene Chloride.

1. Soxhlets with MeCl2 cleaned glasswool cleaned for 1 hour — NM 10/12/93
2. Weigh out 15g of sample
3. Add enough MeCl2 cleaned and baked Na2SO4 to dry (sample should have a sandy texture)
4. All samples spiked with 1.0ml NON-CLP surrogate 50\100 BN\ACID
   If a MS\MSD is needed 1.0ml NON-CLP Matrix spike 50\100 BN\ACID — DC 10.13-93
5. Extract for minimum of 8hours time on 5:30 time off 7:00 AM
6. Check out lot folder
7. Concentrate to 10mls at 65-70 degrees C — 10/13/93
8. Concentrate to 0.5mls at 65-70 degrees C — BMD 10-18-93
9. Bring to 1.0ml MeCL2 in auto sample vials
10. Check lot folder off of clipboard ,turn into GCMS

QC REQUIRED	YES	NO
THAMA BLK		✓
RMA BLK	✓	
MS		✓
MSD		✓

MeCl2 LOT# BG0029

Chain of Custody	To Hood NM 10/12/93	To fridge BJ 10/13/93	From 4° to GCMS BMD 10-18-93

DV2W - 404, 406, 626, 628, 652, 656, 662
668, 666, 730

SAMPLES: TAWTK2 - 16
MWSAW1 - 170, 171

SAMPLE FRACTION: MS
EXTRACTION SOLVENT: Methylene Chloride

10/13/93 GAH/DJD

UM18 CHECKLIST
SVOCs

1. Check out lot folder
2. Pour up 1L of sample into a 2L sep funnel
3. Check PH of sample PH= 7
4. Adjust PH to 11 with 10N NaOH PH= 12
5. Spike sample as follows:
   All samples 1.0ml NON-CLP surrogate 50/100 BN/ACID
   If MS/MSD 1.0ml NON-CLP matrix 50/100 BN/ACID
6. Shake 3 times with 100ml MeCl2, 2min. each shake (BASE)
7. Concentrate (BASE) to 10mls at 65-70 degrees C
8. Adjust PH to 2 with 1:2 H2SO4 PH= 2
9. Shake 3 times with 100ml MeCl2, 2min. each shake (ACID)
10. Concentrate (ACID) to 10mls at 65-70 degrees C
11. Combine BASE and ACID
12. Concentrate to 0.5ml at 65-70 degrees C BMD 10-18-93
13. Bring to 1.0ml MeCl2 in clean auto sample vials
14. Check lot folder off of clipboard, turn in to analyst
15. Check samples into GCMS freezer log book
    Put samples into GCMS freezer

QC REQUIRED		YES	NO
BLK		/	
MS		/	
MSD		/	
MeCl2	LOT# BG-155		
HPLC H2O	LOT# BF700		

Chain of Custody	To Fridge B-1 GAH 10/13/93	Rum2040 GCMS BMD 10-18-93

SAMPLES: RUWAA # 10, 55-60, 66
TNWTR2 # 23, 24, 26, 27, 23MS/MSD, BLK

SAMPLE FRACTION: MS
EXTRACTION SOLVENT: Methylene Chloride

UM18 CHECKLIST SVOCs

1. Check out lot folder — CAC 11-29-93
2. Pour up 1L of sample into a 2L sep funnel
3. Check PH of sample — PH= ~~7/12~~ 7 WI CAC 11-29-93
4. Adjust PH to 11 with 10N NaOH — PH= 11
5. Spike sample as follows:
   All samples 1.0ml NON-CLP surrogate 50/100 BN/ACID
   If MS/MSD 1.0ml NON-CLP matrix 50/100 BN/ACID
6. Shake 3 times with 100ml MeCl2, 2min. each shake (BASE)
7. Concentrate (BASE) to 10mls at 65-70 degrees C — AH 11/29/93
8. Adjust PH to 2 with 1:2 H2SO4 — PH= 2
9. Shake 3 times with 100ml MeCl2, 2min. each shake (ACID)
10. Concentrate (ACID) to 10mls at 65-70 degrees C
11. Combine BASE and ACID
12. Concentrate to 0.5ml at 65-70 degrees C — DJD/GM 11 12-1
13. Bring to 1.0ml MeCl2 in clean auto sample vials
14. Check lot folder off of clipboard, turn in to analyst
15. Check samples into GCMS freezer log book
    Put samples into GCMS freezer — DJD/GM

QC REQUIRED	YES	NO
BLK	✓	
MS	✓	
MSD	✓	

MeCl2 LOT# BC 387
HPLC H2O LOT# BC 427

Chain of Custody	Bench Lab CAC 11-29-93 AH 11/29/93	To Lab AH 11/29/93 26	DJD (GCMS) DJD/GM H 12-1-93

SAMPLES: EBTSWX*1-6, 2ms, 2msd
TNWTR2*22 MIW3*115, BLK

SAMPLE FRACTION: MS
EXTRACTION SOLVENT: Methylene Chloride

UM18 CHECKLIST SVOCs

1. Check out lot folder — DJD 10-27-93 ~~10-27~~ WX 10-27-93 DJD
2. Pour up 1L of sample into a 2L sep funnel
3. Check PH of sample PH= 7
4. Adjust PH to 11 with 10N NaOH PH= 12
5. Spike sample as follows:
   All samples 1.0ml NON-CLP surrogate 50/100 BN/ACID
   If MS/MSD 1.0ml NON-CLP matrix 50/100 BN/ACID
6. Shake 3 times with 100ml MeCl2, 2min. each shake (BASE)
7. Concentrate (BASE) to 10mls at 65-70 degrees C
8. Adjust PH to 2 with 1:2 H2SO4 PH= 2
9. Shake 3 times with 100ml MeCl2, 2min. each shake (ACID)
10. Concentrate (ACID) to 10mls at 65-70 degrees C
11. Combine BASE and ACID
12. Concentrate to 0.5ml at 65-70 degrees C — MJ 10/31/93
13. Bring to 1.0ml MeCl2 in clean auto sample vials
14. Check lot folder off of clipboard, turn in to analyst
15. Check samples into GCMS freezer log book
    Put samples into GCMS freezer

QC REQUIRED		YES	NO
BLK		✓	
MS		✓	
MSD		✓	
MeCl2	LOT# BF982		
HPLC H2O	LOT# BG221		

Chain of Custody	To Fridge 26 DJD 10-27-93 / to Grp MJ 10/31/93

SAMPLES: TNS012 99-108, 112, 113

LH10 AND\OR LH16 CHECKLIST

EXTRACTION SOLVENT: Methylene Chloride OCP/PCBs 10/28/93

SAMPLE FRACTION: SS

1. Soxhlets with thimbles cleaned for 1 hour — GAH
2. Weigh out 15g of sample
3. Add enough baked Na2SO4 to dry (sample should have a sandy texture)
4. Spike samples
   If an MS/MSD is needed spike as if it is a SPK
5. Extract for 16 hours time on 9:00 time off 1:30 — NR
6. Check out separate lot folders for LH10 and LH16 — NR 10/29/93
7. Concentrate to 10mls at 65-70 degrees C — DNB
8. Solvent exchange to Hexane at 83-85 degrees C bring to 10.0mls — BMD 11/9/93
9. Run full column (silica gel) cleanup
   A. 250ml small diameter column (9mm)
   B. DCMS glasswool plug
   C. Slurry pack-3.0g 3% deact. silica gel
   D. Receivers/mini KD'S to collect
   E. Load 2.0ml sample
   F. Follow 1 inch Hexane
   G. Follow 35ml 50/50 Hexane/Methylene Chloride
10. Solvent exchange samples back to Hexane.83-85 degrees C
11. Take to 2.0Ml final volume
12. Check lot folder off of clipboard. Relinquish lot folder to analyst
13. Place samples in fridge C

QC REQUIRED	YES	NO
LH10 SPK		
LH16 SPK		
BLK		
MS		
MSD		

HEXANE LOT# MeCl2 LOT# BG2-2 DNB 11/6/93 lot I

Chain of Custody	TO Hood Lab C GAH 10/28/93	10 FRIDGE WR A 10/29/93	TO E ECD A and B Feng A 11/6/93

Cleanup 27 BMD 11-9-93
Cleanup 19

SAMPLES: JN50122 °85-98

LH10 AND\OR LH16 CHECKLIST

EXTRACTION SOLVENT: Methylene Chloride OCP/PCBs 10/28/93

SAMPLE FRACTION: SS

1. Soxhlets with thimbles cleaned for 1 hour GAH
2. Weigh out 15g of sample
3. Add enough baked Na2SO4 to dry (sample should have a sandy texture)
4. Spike samples
   If an MS/MSD is needed spike as if it is a SPK
5. Extract for 16 hours time on 9:00 time off
6. Check out separate lot folders for LH10 and LH16
7. Concentrate to 10mls at 65-70 degrees C
8. Solvent exchange to Hexane at 83-85 degrees C bring to 10.0mls AH 11/1/93
9. Run full column (silica gel) cleanup BMD 11-5-93
   A. 250ml small diameter column (9mm)
   B. DCMS glasswool plug
   C. Slurry pack-3.0g 3% deact. silica gel
   D. Receivers/mini KD'S to collect
   E. Load 2.0ml sample
   F. Follow 1 inch Hexane
   G. Follow 35ml 50/50 Hexane/Methylene Chloride
10. Solvent exchange samples back to Hexane.83-85 degrees C
11. Take to 2.0Ml final volume
12. Check lot folder off of clipboard. Relinquish lot folder to analyst
13. Place samples in fridge C

QC REQUIRED	YES	NO
LH10 SPK		/
LH16 SPK		/
BLK	/	
MS	/	
MSD	/	

HEXANE LOT# MeCl2 LOT# B6202

Chain of Custody	To Lab A Hood H2O Ext. GAH 10/29/93	#85,95-98 92MS 92MSD Set Bkr To Dominique Fuqua 10/30/93 2PM DLC 10-30-93	#86,88-93 TO Counter DLC 10-30-93	Room A to A AH 11/1/93
Sam 99 Unclean 407 BMD Clean 410 9 11/5/93				

SAMPLES: TNL0124 70-76, 78, 80-84, 87, 94, 115 74MS/D Spk Blk

LH10 AND\OR LH16 CHECKLIST

EXTRACTION SOLVENT: Methylene Chloride OCPs

SAMPLE FRACTION: SS

DLC/CAG

1. Soxhlets with thimbles cleaned for 1 hour ✓
2. Weigh out 15g of sample ✓
3. Add enough baked Na2SO4 to dry (sample should have a sandy texture) ✓
4. Spike samples If an MS/MSD is needed spike as if it is a SPK ✓
5. Extract for 16 hours time on 5:30pm time off
6. Check out separate lot folders for LH10 and LH16
7. Concentrate to 10mls at 65-70 degrees C 11/3/93
8. Solvent exchange to Hexane at 83-85 degrees C bring to 10.0mls 11/4/93
9. Run full column (silica gel) cleanup BMD 11/5/93
   - A. 250ml small diameter column (9mm)
   - B. DCMS glasswool plug
   - C. Slurry pack-3.0g 3% deact. silica gel
   - D. Receivers/mini KD'S to collect
   - E. Load 2.0ml sample
   - F. Follow 1 inch Hexane
   - G. Follow 35ml 50/50 Hexane/Methylene Chloride
10. Solvent exchange samples back to Hexane.83-85 degrees C
11. Take to 2.0Ml final volume
12. Check lot folder off of clipboard. Relinquish lot folder to analyst
13. Place samples in fridge C

QC REQUIRED	YES	NO
LH10 SPK	✓	
LH16 SPK		✓
BLK	✓	
MS	✓	
MSD	✓	

HEXANE LOT# MeCl2 LOT#

Chain of Custody	TO HOODS LABD DLC/CAG 11-02-93	11/3/93	To lab B #20 11-4-93	To Fridge A 11-4-93 BD	Hexane to Methanol to Clean to 19
					BMD 11/5/93

SAMPLES: TNWTR2*70,72,74,76

SAMPLE FRACTION: EC
EXTRACTION SLOVENT: Methylene Chloride

UH13 CHECKLIST OCPs

1. Check out lot folder — NA
2. 800ml sample in sep-funnel STD H2O for SPK and BLK — JJD 2-4-94
3. Check PH of the sample, adjust to 6-8 PH=7
4. Spike samples as follows:
   All samples 1.0ml TCX/DCBP surrogate 1000ug/ml
   UH13 SPK 1.0ML UH13 SPK OCP'S 400NG/ML
   ISODRIN/METHOXY 800NG/ML — WTF 2/5/94
5. Shake 3 times with 50ml MeCl2, 2min each shake — 2/5/94
6. Concentrate to 10mls at 65-70 degrees C
7. Solvent exchange to Hexane at 83-85 degrees C — 2/7/94
8. Take t
9. If cle ini column cleanup
   If no)

OPTIONAL — START OPTIONAL

11-27-93 Thru 3-17-94

A. Giant
B. DCMS g
C. 1.5g 3 with a Na2SO4 cap
D. Receiv
E. Load 2
F. Follow e
G. Follow
H. Solven -85 degrees C
I. Bring el clean
J. Vial u

END OPTIONAL

10. Check n in to analyst
11. Clean samples to fridge C, unclean to fridge B2

QC REQUIRED	YES	NO
UH13 SPK	✓	
UH13 BLK	✓	
MS		✓
MSD		✓

MeCl2 LOT# BG752
HPLC H2O LOT# BG581
Hexane LOT#

WITF 2/7/94.

Chain of Custody	TOFridge29 JJD 2-4-94 / to Prep 2/6 ~~2/7~~ 2/5/94	Sum29&019 BMD 2-7-94

SAMPLES: TNUTR2 '23, 24, 26, 27

SAMPLE FRACTION: EC
EXTRACTION SLOVENT: Methylene Chloride

UH13 CHECKLIST OCPs

1. Check out lot folder — JBK
2. 800ml sample in sep-funnel STD H2O for SPK and BLK
3. Check PH of the sample, adjust to 6-8 PH= 7
4. Spike samples as follows:
   All samples 1.0ml TCX/DCBP surrogate 1000ug/ml
   UH13 SPK 1.0ML UH13 SPK OCP'S 400NG/ML
   ISODRIN/METHOXY 800NG/ML — JBK
5. Shake 3 times with 50ml MeCl2, 2min each shake 11/29/93 — GAH
6. Concentrate to 10mls at 65-70 degrees C 11/30/93 — NM
7. Solvent exchange to Hexane at 83-85 degrees C — BMD 12-1-93
8. Take to 10mls in G.C. tubes
9. If cleanup is needed go to optonal mini column cleanup — NA
   If no cleanup is needed go to step 10

OPTIONAL MINI COLUMN CLEANUP — START OPTIONAL

A. Giant pipets in mini column stand
B. DCMS glasswool plug
C. 1.5g 3% deact. silica gel in column with a Na2SO4 cap
D. Receiver to collect
E. Load 2.0ml on column
F. Follow with a 50/50 MeCl2/Hexane rinse
G. Follow with 10ml 50/50
H. Solvent exchange back to Hexane at 83-85 degrees C
I. Bring to 2.0ml in 4ml amber vials, label clean
J. Vial unclean in 10ml amber vials

END OPTIONAL

10. Check lot folder off of clipboard, turn in to analyst — BMD 12-1-93
11. Clean samples to fridge C; unclean to fridge B2

QC REQUIRED	YES	NO
UH13 SPK	✓	
UH13 BLK	✓	
MS	✓	
MSD	✓	

MeCl2 LOT# BG108
HPLC H2O LOT# BG153
Hexane LOT#

Chain of Custody	to LAB D GAH 11/29/93	FRIDGE A NM 11/30/93	Atom 930119 BMD 12-1-93

SAMPLES: ERM S- 105, 107, TNSOIL2 -183

SAMPLE FRACTION: SS
EXTRACTION SOLVENT: ACN

LW12 CHECKLIST

..	Hood dry samples overnight -Explosives	DCA 11-18-93
2.	Check out lot folder	AT 11/19/93
3.	Crush samples	
4.	Weigh out 1.0g of sample into 6ml shorty vial	
5.	Weigh out 10g for moistures(wet) into tared weigh boats	
6.	Place samples for moistures in oven, time in 2p time out ~~2130~~	CAT 11/20/93 C
7.	Spike samples per analyst, let sit 1hour	
8.	Add 2.0ml ACN to each	
9.	Vortex for 30 sec. each	
10.	Place in sonicator for 16 hours time in 2p time out 2130 11/20 time on water temp 12°C time off water temp 25°C	
11.	Centrifuge samples for 10min 1000-1500 RPM	CAT
12.	Filter sample through .45um acrodisc	
13.	Remove samples for moistures from oven let cool, weigh	
14.	Put samples in freezer C	11/20/93 CAT

QC REQUIRED	YES	NO
BLK	✓	
L-SPK	✓	
H-SPK1	✓	
H-SPK2	✓	
H-SPK3	✓	
MS	✓	
MSD	✓	

Chain of Custody	To Hood LABC DCA-19-93	to Sonicator lab A AT 11/19/93	Freezer 19 11/20/93 CAT

SAMPLES: TN501L2*68,69

SAMPLE FRACTION: SS
EXTRACTION SOLVENT: ACN

LW12 CHECKLIST

1. Hood dry samples overnight — Explosives — CAT
2. Check out lot folder — ↓ 10/14/93
3. Crush samples — CAT
4. Weigh out 1.0g of sample into 6ml shorty vial
5. Weigh out 10g for moistures(wet) into tared weigh boats
6. Place samples for moistures in oven, time in 1700 time out
7. Spike samples per analyst, let sit 1hour
8. Add 2.0ml ACN to each
9. Vortex for 30 sec. each
10. Place in sonicator for 16 hours — 10/15/93 CAT — time in 1445 time out 10 AM 10/17/93
    time on water temp 23°C — time off water temp 14°C 10/17/93
11. Centrifuge samples for 10min 1000-1500 RPM
12. Filter sample through .45um acrodisc
13. Remove samples for moistures from oven let cool, weigh
14. Put samples in freezer C

QC REQUIRED	YES	NO
BLK	✓	
L-SPK	✓	
H-SPK1	✓	
H-SPK2	✓	
H-SPK3	✓	
MS	✓	
MSD	✓	

Chain of Custody	Hood C-1 10/14/93 CAT	Sonicator Lab A 10/16/93 CAT	to freezer C RJ 10/17/93

SAMPLES: TN501L2 + 231 - 250, 275

SAMPLE FRACTION: SS
EXTRACTION SOLVENT: ACN

LW12 CHECKLIST

Explosives

1.	Hood dry samples overnight	CAT
2.	Check out lot folder	↓ 10/24/93
3.	Crush samples	CAT
4.	Weigh out 1.0g of sample into 6ml shorty vial	
5.	Weigh out 10g for moistures(wet) into tared weigh boats	
6.	Place samples for moistures in oven, time in 1700 time out	
7.	Spike samples per analyst, let sit 1hour	
8.	Add 2.0ml ACN to each	
9.	Vortex for 30 sec. each	
10.	Place in sonicator for 16 hours time in 1900 time out 1620 10/25/93 time on water temp 13°C time off water temp 11°C	
11.	Centrifuge samples for 10min 1000-1500 RPM	CAT
12.	Filter sample through .45um acrodisc	
13.	Remove samples for moistures from oven let cool, weigh	
14.	Put samples in freezer C	↓ 10/26/93

QC REQUIRED	YES	NO
BLK	✓	
L-SPK	✓	
H-SPK1	✓	
H-SPK2	✓	
H-SPK3	✓	
MS	✓	
MSD	✓	

Chain of Custody	Hood C-1 10/24/93 CAT	Sonicator Lab A 10/25/93 CNT	Freezer 19 10/26/93 CAT

SAMPLES: TNSOIL2 * 251-266, 276

SAMPLE FRACTION: SS
EXTRACTION SOLVENT: ACN

LW12 CHECKLIST

1. Hood dry samples overnight — Explosives — CAT
2. Check out lot folder — ↓ 10/28/93
3. Crush samples — CAT
4. Weigh out 1.0g of sample into 6ml shorty vial
5. Weigh out 10g for moistures(wet) into tared weigh boats — 10/30/93
6. Place samples for moistures in oven, time in 1400 (10/29/93) time out 1300
7. Spike samples per analyst, let sit 1hour
8. Add 2.0ml ACN to each
9. Vortex for 30 sec. each — 10/29/93
10. Place in sonicator for 16 hours — time in 1615 time out 1030 (10/30) — time on water temp 20°C — time off water temp 10 20C
11. Centrifuge samples for 10min 1000-1500 RPM — CAT
12. Filter sample through .45um acrodisc
13. Remove samples for moistures from oven let cool, weigh
14. Put samples in freezer C — 10/30/93

QC REQUIRED	YES	NO
BLK	✓	
L-SPK	✓	
H-SPK1	✓	
H-SPK2	✓	
H-SPK3	✓	
MS	✓	
MSD	✓	

Chain of Custody	Hood C-3 10/28/93 CAT	Sonicator Lab A 10/29/93 CAT	Freezer 19 10/30/93 CAT

SAMPLES: TN3012# 65-67, 163-172, 290, 291

SAMPLE FRACTION: SS
EXTRACTION SOLVENT: ACN

LW12 CHECKLIST

1. Hood dry samples overnight — Explosives — DLC 11-09-93
2. Check out lot folder
3. Crush samples — CAT
4. Weigh out 1.0g of sample into 6ml shorty vial
5. Weigh out 10g for moistures(wet) into tared weigh boats
6. Place samples for moistures in oven, time in 1900 time out 1830
7. Spike samples per analyst, let sit 1hour
8. Add 2.0ml ACN to each
9. Vortex for 30 sec. each
10. Place in sonicator for 16 hours time in 2200 time out 3:30pm 11-11-93
    time on water temp 21°C time off water temp 15°C
11. Centrifuge samples for 10min 1000-1500 RPM — CAT/DLC
12. Filter sample through .45um acrodisc
13. Remove samples for moistures from oven let cool, weigh
14. Put samples in freezer C

QC REQUIRED	YES	NO
BLK	✓	
L-SPK	✓	
H-SPK1	✓	
H-SPK2	/	
H-SPK3	/	
MS	/	
MSD	/	

Chain of Custody	TO Hoods LABC DLC 11-10-93	Sonicator Lab A 11/10/93 CAT	Freezer 19 11/11/93 DLC/CAT
	WDXC 11-11-93		

SAMPLES: TN5012L2 x41-57, 62-64

SAMPLE FRACTION: SS
EXTRACTION SOLVENT: ACN

LW12 CHECKLIST

1. Hood dry samples overnight — Explosives — DLC 11-09-93
2. Check out lot folder ✓
3. Crush samples — CAT
4. Weigh out 1.0g of sample into 6ml shorty vial
5. Weigh out 10g for moistures(wet) into tared weigh boats
6. Place samples for moistures in oven, time in 1900 time out 1830
7. Spike samples per analyst, let sit 1hour
8. Add 2.0ml ACN to each
9. Vortex for 30 sec. each — 11/10/93 CAT
10. Place in sonicator for 16 hours time in 2200 time out 3:30 11-11-93
    time on water temp 21°C time off water temp 15°C
11. Centrifuge samples for 10min 1000-1500 RPM — DLC/CAT
12. Filter sample through .45um acrodisc
13. Remove samples for moistures from oven let cool, weigh
14. Put samples in freezer C — 11/11/93

QC REQUIRED	YES	NO
BLK	✓	
L-SPK	✓	
H-SPK1	✓	
H-SPK2	✓	
H-SPK3	✓	
MS	✓	
MSD	✓	

Chain of Custody	TO HOOD LAB C DLC 11-09-93	Sonicator Lab A 11/10/93 CAT	Freezer 19 11/11/93 DLC/CAT

SAMPLES: TN5012 ✗ 22, 21, 23-40

SAMPLE FRACTION: SS
EXTRACTION SOLVENT: ACN

LW12 CHECKLIST

Explosives

DLC 11-09-93 ✓

1. Hood dry samples overnight ↓ ✓
2. Check out lot folder
3. Crush samples — CAT
4. Weigh out 1.0g of sample into 6ml shorty vial
5. Weigh out 10g for moistures(wet) into tared weigh boats
6. Place samples for moistures in oven, time in 1900 time out 1830
7. Spike samples per analyst, let sit 1hour
8. Add 2.0ml ACN to each
9. Vortex for 30 sec. each — 11/10/93 CAT
10. Place in sonicator for 16 hours time in 2200 time out 3:20pm DLC 11-11
    time on water temp 21°C time off water temp 15°C
11. Centrifuge samples for 10min 1000-1500 RPM — DLC/CAT
12. Filter sample through .45um acrodisc
13. Remove samples for moistures from oven let cool, weigh
14. Put samples in freezer C — 11/11/93

QC REQUIRED	YES	NO
BLK	✓	
L-SPK	✓	
H-SPK1	✓	
H-SPK2	✓	
H-SPK3	✓	
MS	✓	
MSD	✓	

Chain of Custody	TO HOOD LABC DLC 11-09-93	Sonicator bath A 11/10/93 CAT	Freezer 19 11/11/93 DLC/CAT

SAMPLES: TAS0142 # 1-20

SAMPLE FRACTION: SS
EXTRACTION SOLVENT: ACN

LW12 CHECKLIST

1. Hood dry samples overnight — Explosives — DLC 11-09-93 ✓
2. Check out lot folder ✓
3. Crush samples — CAT
4. Weigh out 1.0g of sample into 6ml shorty vial
5. Weigh out 10g for moistures(wet) into tared weigh boats
6. Place samples for moistures in oven, time in 1900 time out 1830
7. Spike samples per analyst, let sit 1hour
8. Add 2.0ml ACN to each
9. Vortex for 30 sec. each — 11/10/93 CAT — DLC 11-11-93
10. Place in sonicator for 16 hours — time in 2200 time out 3:20pm 11-11- ~~3:20pm~~ wtlc 11-11-93
    time on water temp 21°C — time off water temp 15°C
11. Centrifuge samples for 10min 1000-1500 RPM — DLC/CAT
12. Filter sample through .45um acrodisc
13. Remove samples for moistures from oven let cool, weigh
14. Put samples in freezer C — 11/11/93

QC REQUIRED	YES	NO
BLK	✓	
L-SPK	✓	
H-SPK1	✓	
H-SPK2	✓	
H-SPK3	✓	
MS	✓	
MSD	✓	

Chain of Custody	TO HOOD LABC DLC 11-09-93	Sonicator Lab A 11/10/93 CAT	Freezer 19 11/11/93 DLC/CAT

SAMPLES: TN5012.2 * 173-182, 181 MS/MSD L-1, H-1
H-2, H-3, Blk 292

SAMPLE FRACTION: SS
EXTRACTION SOLVENT: ACN

LW12 CHECKLIST

DC 11-12-93

1. Hood dry samples overnight — Explosives
2. Check out lot folder
3. Crush samples — CAT
4. Weigh out 1.0g of sample into 6ml shorty vial
5. Weigh out 10g for moistures(wet) into tared weigh boats
6. Place samples for moistures in oven, time in 1530 time out
7. Spike samples per analyst, let sit 1hour
8. Add 2.0ml ACN to each
9. Vortex for 30 sec. each
10. Place in sonicator for 16 hours — 11/13/93 CAT
    time on water temp 23°C — time in 1715 time out 1730 — 11/14/93
    time off water temp
11. Centrifuge samples for 10min 1000-1500 RPM — MM 11/14/93
12. Filter sample through .45um acrodisc
13. Remove samples for moistures from oven let cool, weigh
14. Put samples in freezer C

QC REQUIRED	YES	NO
BLK	✓	
L-SPK	✓	
H-SPK1	✓	
H-SPK2	✓	
H-SPK3	✓	
MS	✓	
MSD	✓	

Chain of Custody	TO HOOD LABC DC 11-10-93	Sonicator Lab A 11/13/93 CAT	to freezer C MM 11/14/93

LOT- JGLA

SAMPLES: MW3*67, 122, 123

TNUSTR2*11, 20, 11ms/msD, L-1, H-1, H-2, BLK

SAMPLE FRACTION: LC

EXTRACTION SOLVENT: ACN

UW32 CHECKLIST

Explosives

		CAT DLC 11-11-93
1.	Check out lot folder	✓
2.	Pour up 500ml of the sample into a 500 ml volumetric Use STD H2O for QC	✓
3.	Spike the samples	✓
4.	Pack a 6ml Baker extraction column with 0.5g PORAPAK	✓
5.	Rinse column with 15ml ACN then 30ml HPLC H2O	✓
6.	Pass the through the column at 10ml/min	✓
7.	Elute the column with 3ml ACN, collect in G.C. tubes	✓
8.	Concentrate the Elutent to 2ml with nitrogen	DHD 11/14
9.	Bring to 6ml HPLC H2O final volume	DHD
10.	Check lot folder off of the clipboard, turn in to the analyst	DHD
11.	Place samples in fridge C	DHD

QC REQUIRED	YES	NO
BLK	✓	
L1	✓	
H1	✓	
H2	✓	
ER SPK	✓	

HPLC H2O LOT# BG153

ACN LOT# BF677

Chain of Custody	To Fridge 89 DLC 11-11-93	From Fridge 29 To Fridge 19 DHD 11/14/93

SAMPLES: MW3* 64, 73, 82, 83, 119, TNWTR2* 21, UMPUT* 199-202, EBSTW* 12-14, 20, EBSTW* 21-24

SAMPLE FRACTION: LC

EXTRACTION SOLVENT: ACN

UW32 CHECKLIST

Explosives

CAT

1. Check out lot folder
2. Pour up 500ml of the sample into a 500 ml volumetric Use STD H2O for QC
3. Spike the samples
4. Pack a 6ml Baker extraction column with 0.5g PORAPAK
5. Rinse column with 15ml ACN then 30ml HPLC H2O
6. Pass the through the column at 10ml/min
7. Elute the column with 3ml ACN, collect in G.C. tubes
8. Concentrate the Elutent to 2ml with nitrogen
9. Bring to 6ml HPLC H2O final volume
10. Check lot folder off of the clipboard, turn in to the analyst
11. Place samples in fridge C

11/15/93 CAT

QC REQUIRED	YES	NO
BLK	✓	
L1	✓	
H1	✓	
H2	✓	
ER SPK	✓	

HPLC H2O LOT# BG 221

ACN LOT# ~~BG 475~~ WJ 11/15/93 BG 247

Chain of Custody	~~fridge 19~~ 11/15/93 CAT

SAMPLES: EBTSWX-7 TNWTR2-10

MWSAW1-26-28, 154, 173

SAMPLE FRACTION: LC

EXTRACTION SOLVENT: ACN

UW32 CHECKLIST

1. Check out lot folder — Explosives — KP 11/7/93
2. Pour up 500ml of the sample into a 500 ml volumetric Use STD H2O for QC
3. Spike the samples
4. Pack a 6ml Baker extraction column with 0.5g PORAPAK
5. Rinse column with 15ml ACN then 30ml HPLC H2O
6. Pass the through the column at 10ml/min
7. Elute the column with 3ml ACN, collect in G.C. tubes
8. Concentrate the Elutent to 2ml with nitrogen
9. Bring to 6ml HPLC H2O final volume
10. Check lot folder off of the clipboard, turn in to the analyst
11. Place samples in fridge C

QC REQUIRED	YES	NO
BLK	✓	
L1	✓	
H1	✓	
H2	✓	
ER SPK	✓	

HPLC H2O LOT# BG221

ACN LOT# BF677

Chain of Custody	to fridge C KP 11/7/93

SAMPLES: TNWTR2 12
EBTSW 01

SAMPLE FRACTION: LC

EXTRACTION SOLVENT: ACN

10/14/93

UW32 CHECKLIST

Explosives

1. Check out lot folder — GAH.
2. Pour up 500ml of the sample into a 500 ml volumetric Use STD H2O for QC
3. Spike the samples
4. Pack a 6ml Baker extraction column with 0.5g PORAPAK
5. Rinse column with 15ml ACN then 30ml HPLC H2O
6. Pass the through the column at 10ml/min
7. Elute the column with 3ml ACN, collect in G.C. tubes — 10/23/93 GAH.
8. Concentrate the Elutent to 2ml with nitrogen
9. Bring to 6ml HPLC H2O final volume
10. Check lot folder off of the clipboard, turn in to the analyst — NL
11. Place samples in fridge C

QC REQUIRED	YES	NO
BLK	✓	
L1	✓	
H1	✓	
H2	✓	
ER SPK	✓	

HPLC H2O LOT# BF700
ACN LOT# BF677

Chain of Custody	To Fridge 29 / To Fridge 19 / GAH 10/14/93 GAH 10/23/93

SAMPLES: EBTJL '23, 24
TNWTR2 23, 24, 26, 27

SAMPLE FRACTION: LC

EXTRACTION SOLVENT: ACN

11/29/93

UW32 CHECKLIST

1. Check out lot folder Explosives GAH
2. Pour up 500ml of the sample into a 500 ml volumetric Use STD H2O for QC
3. Spike the samples
4. Pack a 6ml Baker extraction column with 0.5g PORAPAK
5. Rinse column with 15ml ACN then 30ml HPLC H2O
6. Pass the through the column at 10ml/min
7. Elute the column with 3ml ACN, collect in G.C. tubes
8. Concentrate the Elutent to 2ml with nitrogen GAH
9. Bring to 6ml HPLC H2O final volume
10. Check lot folder off of the clipboard, turn in to the analyst NK
11. Place samples in fridge C 11/30/93. GAH

QC REQUIRED	YES	NO
BLK	✓	
L1	✓	
H1	✓	
H2	✓	
ER SPK	✓	

HPLC H2O LOT# BG 153
ACN LOT# BF 462

Chain of Custody	To Fridge 29 GAH 11/29/93	To Fridge 19 GAH 11/30/93

SAMPLES: ERMIWA # 57-61, 81, 88-~~94~~ 93 WT 2/7/94 CAT

TNWTR2 # 70, 72, 74, 76, DV2W # 407

SAMPLE FRACTION: LC

EXTRACTION SOLVENT: ACN

UW32 CHECKLIST

Explosives

1. Check out lot folder — NA
2. Pour up 500ml of the sample into a 500 ml volumetric Use STD H2O for QC — CAT
3. Spike the samples
4. Pack a 6ml Baker extraction column with 0.5g PORAPAK
5. Rinse column with 15ml ACN then 30ml HPLC H2O
6. Pass the through the column at 10ml/min
7. Elute the column with 3ml ACN, collect in G.C. tubes
8. Concentrate the Elutent to 2ml with nitrogen
9. Bring to 6ml HPLC H2O final volume
10. Check lot folder off of the clipboard, turn in to the analyst
11. Place samples in fridge C — 2/7/94

QC REQUIRED	YES	NO
BLK	✓	
L1	✓	
H1	✓	
H2	✓	
ER SPK	✓	

HPLC H2O LOT# BG 581

ACN LOT# BG 563

Chain of Custody	~~Friday~~ 2/7/94 CAT

Samples TNWTR2-14

TPH water (Petroleum water)
Solvent : CS_2

1) Set up 125ml amber vials with Teflon lined caps for spike and blank. Add HPLC water to the top. JJ 11/1/93

2) Remove ~~10.0ml of~~ sample from all the bottles. Use ~~syringes~~ equiped with needles capable of reaching the center of the bottle. ~~Put~~ 100ml of sample to bottle JJ 11/1/93 (F2) JH 11/1/93 (F0)

3) Spike samples. Add 5.0ml CS_2 to all. Relinquish to rotory action shaker for 30 minutes.

4) If CS_2 phase has formed emulsions with the sample, centrifuge at 800 RPM for 10 minutes. Pipette out the CS_2 layer into shorty vials. Mark solvent level.

5) Measure volume of the bottles by filling the bottles with water and then measuring the volume of the water with a class A graduated cylinder.

6) Tabulate the extraction volume as the volume of the bottle minus 10.0ml (volume removed).

7) Relinquish extracts to fridge C. Discard extracted waste in the box marked for CS_2 extraction waste

QC Required
MS ✓
MSD ✓
SPIKE ✓
BLANK ✓

HPLC water lot BG221
CS_2 lot CS249HF

Chain of Custody	to shelf TCLP lab / to fridge C / JH 11/1/93 10:00am JH 11/1/93

SAMPLES: TWSOIL2 * 109-111, 114

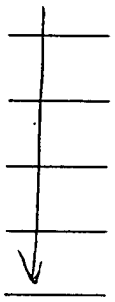
SAMPLE FRACTION: SS

EXTRACTION SOLVENT: CS2

PET SOILS

1. Weigh out 10.0g of sample into a 40ml amber vial
   Use Mallinckrodt sand for QC
2. Spike the samples
3. Add 10.0ml CS2 to each vial
4. Place on wrist action shaker for 30 min.
5. Pipet CS2 layer into a 6ml shorty vial
6. Place samples in fridge C

CAT



QC REQUIRED	YES	NO
MS	✓	
MSD	✓	
SPK	✓	
BLK	✓	

CS2 LOT # 05249HF

Chain of Custody	~~Fridge~~ 19 10/28/93 CAT

SAMPLES: TWSOIL2* 109-111, 114

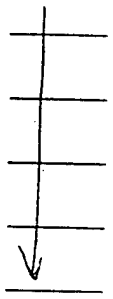
SAMPLE FRACTION: SS

EXTRACTION SOLVENT: CS2

PET SOILS

1. Weigh out 10.0g of sample into a 40ml amber vial
   Use Mallinckrodt sand for QC
2. Spike the samples
3. Add 10.0ml CS2 to each vial
4. Place on wrist action shaker for 30 min.
5. Pipet CS2 layer into a 6ml shorty vial
6. Place samples in fridge C

CAT



QC REQUIRED	YES	NO
MS	✓	
MSD	✓	
SPK	✓	
BLK	✓	

CS2 LOT # 05249HF

Chain of Custody	fridge 19 10/28/93 CAT

APPENDIX F

SWMU 42 GEOPHYSICAL SURVEY RESULTS

F.1 INTRODUCTION

F.1.0.1. During Phase II field sampling conducted in October 1993, Montgomery Watson field personnel encountered surface debris resulting from waste disposal activities at the demilitarization furnaces previously located at the Bomb Washout Building (SWMU 42) and other nearby furnace operations. To explore the possibility that generated wastes may previously have been disposed of (buried) in this area, a geophysical investigation was conducted using soil conductivity, portable magnetometer, and non-ferrous metal detection methods. The investigation encompassed an approximately 800-foot by 2,000-foot (37-acre) area of open field near the Bomb Washout Building (Building 539) during the period of April 16 to May 3, 1994.

F.1.0.2. Presented in this appendix is the final summary report of this geophysical investigation prepared by Practical Geophysics, Inc. of Salt Lake City, Utah. The report consists of an introduction, a description of the methodology and field procedures, and a discussion of results. Appended to the report is a listing and location of subsurface anomalies, and surface items and disposal areas encountered by the geophysical crew. These features are located both by geophysical search grid coordinates and by bearings and distances from an established survey point. The latter method will allow these features to be located at any future time, should a cleanup operation be deemed necessary.

F.2 SCOPE OF GEOPHYSICAL INVESTIGATION

F.2.0.1. The scope of the geophysical investigation at SWMU 42 consisted of the following activities:

- Setting up a search grid over the investigation area to allow east-west traverses to be completed on 15-foot centers.

- Using a GEM Systems model GSM-8 portable field magnetometer, in conjunction with a field non-ferrous metal detector, to conduct a sweep of the area along the east-west traverses.

- Using a Geonics Ltd. Model EM-31 soil conductivity measuring system to search for contrasts in soil conductivity between undisturbed native soil and the disturbed soil associated with any burial features that might be present.

- Flagging subsurface anomalies and any surface items of interest encountered (i.e., significant area of debris, ordnance items, surface mounding, etc.).

- Using a total station surveying instrument to turn angles and set distances from a set reference point to establish the locations of the surface and subsurface features, and construct a comprehensive map of the investigation area showing these features.

F.3 SUMMARY OF RESULTS

F.3.0.1. The results of the geophysical activities at SWMU 42 are summarized as follows:

- A total of approximately 100,000 feet of geophysical traverses were completed during the investigation, and more than 300 individual anomalous features were discovered.

- Most of these features were on the surface, such as metallic debris piles.

- Surface anomalies included both inert and live small and large caliber ammunition, two inert hand grenades, several (probably) inert cluster bomblets, and multiple directional anti-personnel rounds.

- Six locations were staked for subsequent test pit excavation based on the geophysical results.

TOOELE ARMY DEPOT - NORTH AREA

SWMU 42 - GEOPHYSICAL INVESTIGATION

For: Montgomery Watson

By: Practical Geophysics, Inc.

May 1994

PRACTICAL GEOPHYSICS, INC.

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LIST OF ILLUSTRATIONS

Plate I Site Map Showing Anomaly Locations

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INTRODUCTION

Geophysical investigation of SWMU 42 was conducted to help evaluate the extent and type of hazardous waste occurances at this site. The initial proposed geophysical work was designed to detect and delineate possible waste disposal pits or trenches. Following the discovery of live ammunition lying on the surface the geophysical work was modified to include a thorough sweep of the immediate surface area for metal waste. Non-hazardous surface debris was to be cleaned up by geophysical survey personnel. The detection and partial delineation of over 300 sites with anomalous geophysical signatures within the search area precluded any attempt to clean up the large amount of associated source material. In particular, the discovery of live rounds of ammunition, hand grenades, cluster bombs, etc., requires cleanup procedures beyond the capability of the geophysical survey crew.

This report describes the methodology and field procedures used for the geophysical investigation and results of this investigation.

GEOPHYSICAL METHODOLOGY AND FIELD PROCEDURES

The approximate 38-acre SWMU 42 area was searched using three separate geophysical methods to detect the following possible occurances; surface/near-surface metal (both ferrous and non-ferrous), soil conductivity anomalies associated with burial of metallic and non-metallic waste to a depth of 12 feet and buried magnetic scrap iron and steel to a depth of 10 to 15 feet, depending upon the volume of scrap material. The respective geophysical search techniques were electromagnetic small search coils for individual metal items on or in the near-surface, the EM-31 soil conductivity system to search for relatively large volume burial pits and trenches, and a Gem Systems, Model GSM-8 proton precession magnetometer to detect relatively large volumes of buried scrap iron or steel. The use of these three methods provided a degree of redundancy, which, along with substantially 100 percent coverage of the area, insured the detection of essentially all possible anomolous occurances, from near-surface, single-round, small-caliber ammunition to conductive or magnetic waste material in disposal pits.

A search grid origin was established 30 feet N70°W from the NW corner (reference fence corner) of a chain link fenced compound located approximately 450 feet N20°E of Building 539, (see Plate I). Rather than record individual measurements at specific grid points, N-S grid lines spaced 15 feet apart were surveyed at a slow walk by sweeping the instrument sensors side-to-side in an arc across the grid line. This method allowed for essentially total search coverage requiring the least

amount of field time. When an anomalous reading was displayed by any of the three instruments, the other two instruments tested the same site to confirm the anomalous reading. The site would be visually inspected for surface evidence of anomalous material and flagged using red, orange, yellow or blue pin flags. This continuous, as opposed to spot, measurement method precluded the recording of sets of gridded geophysical values. The search objective was to detect and delineate solid waste sites, not produce contoured sets of geophysical data. Efficiency and thoroughness of the investigation were accomplished at the expense of contour maps.

DISCUSSION OF RESULTS

The purpose initially designed for the geophysical investigation was to locate and delineate at least four anomalous sites, which were to be sampled for their chemical content. Preliminary visits to the SWMU 42 area resulted in the discovery of numerous occurances of small caliber ammunition lying within the area. The geophysical search parameters were modified to include a search for surface/near-surface metal (ferrous and non-ferrous) and instructions to conduct reasonable surface clean-up during the surveys.

A thorough sweep of the area, made with the metal detector and magnetometer, required seven field days to complete. The follow-up EM-31 soil conductivity survey required six field days. The combined results of using the three geophysical methods produced over 300 individual anomalous sites. In some instances the anomalous sites have no surface source material, implying shallow to possibly deep burial. In most all cases the anomalous sites represent numerous to countless anomaly sources, e.g., piles of ammunition rather than single items. In most all cases, the anomalous site centers were determined and flagged, but their areal extents were not fully delineated. In some instances sub-areas are continuously anomalous for several hundred feet, e.g., backfilled old railroad cut grade.

Surface anomalous source material included not only small caliber disarmed munitions but also small and large caliber live ammunition, at least two spherical cluster bombs, several pop-bottle shaped cluster bombs, and two hand grenades. The sheer volume of anomalous material, some live ammunition and other larger ordinance and unknown buried anomalous source material all precluded surface clean-up activity.

A post-survey, on-site meeting of TAD, State and Montgomery representatives concluded that site-clean-up would not be immediately possible and that eventual clean-up would involve a complete and detailed geophysical re-sweep of the area by explosive ordinance specialists.

A final field day was spent surveying the locations of the most significant geophysically anomalous sites, significant in areal extent or anomaly amplitude(s) or both. Plate I shows the locations of these anomalous sites as well as detected and delineated utility lines. The locations of these sites give several choices for follow-up chemical sampling.

Appendix A of this report lists the various sites by index number shown on Plate I and describes the site characteristics. The site coordinates listed in Appendix A are measured from the search grid origin. Appendix B also lists the sites by index number, but gives the bearings and distances to the individual sites from the instrument base shown on Plate I. The instrument base is located 510 feet N70°W from the reference fence corner. This base site was selected since the entire search area can be surveyed from this vantage point. Bearing angles were measured clockwise from a reference bearing of zero degrees between the instrument base and the reference fence corner.

Coordinates for (bearings and distances to) the remaining 300 plus anomalous sites were not established since future clean-up will require a thorough sweep and clean-up of the entire area.

APPENDIX A

(See site map showing anomaly locations)

ANOMALY SITE DESCRIPTIONS AND LOCATIONS

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TAD-North Area, Bldg. 539(SWMU 42) Geophysical Investigation

ANOMALY SITE #	SEARCH GRID COORDINATES (in feet)	DESCRIPTION OF SITE
1	W383,N 168	Underground cable NW-SE
2	W380,N 265	Intersection overhead powerline & underground waterlir
3	W299,N 207	3 piles 50 cal. slugs 15' dia. area
4	W126,N 97	Piles 50 cal. slugs 10' dia. circle
5	W111,N 106	Utility box
6	W 7,N 67	Melted lead & casings pile
7	E109,N 60	Intersection waterline & underground cable
8	E261,N 33	Intersection underground cable & utility
9	E328,N 66	Mag 300 gammas N-S road
10	E367,N 62	Ash & charcoal pile
11	E393,N 64	Power pole
12	E372,N 90	Several piles slugs-ash-charcoal 20' dia. area
13	E340,N 102	Lead pile
14/13*	E387,N 170	Intersection RR tracks & waterline
15/14	E326,N 183	Mag 500 gammas slugs,misc. iron 25' dia. circle
16/15	E300,N 188	Mag 150 gammas N-S road, slugs
17/16	E327,N 258	RR crossing
18/17	E276,N 283	2 piles slugs ash-charcoal
19/18	E216,N 337	2 piles casings sm. cal.
20/19	E158,N 246	50 cal. slugs
21/20	E 60,N 239	Underground utility EM-40 mmhos
22/21	E 45,N 237	Mag 300 gammas
23/22	W 74,N 376	Underground tuility EM-40 mmhos S. edge road
24/23	W398,N 321	Waterline EM-30 mmhos S. edge road
25/24	W508,N 298	Intersection RR tracks & overhead powerline
26/25	W584,N 241	Intersection RR tracks & underground cable
27/26	W834,N 50	Intersection RR tracks & new telephone line
28/27	W777,S 21	Old telephone post
29/28	W715,S 66	Large brass casings 75,105-155 mm?
30	W580,S 197	Pond dam Mag 300 gammas
31	W526,S 225	Ctr. of pond
32	W605,S 478	N. end trench Mag 600 gammas EM-10 mmhos
33	W594,S 590	Ctr. N-S trench
34	W583,S 712	S. end trench Mag 500 gammas
35	W614,S 896	Cluster bomb (?) yellow
36	W622,S 980	RR cut barb. wire 50'N
37	W569,S1140	RR cut Mag 400 gammas EM-10 mmhos
38	W728,S1159	Old telephone line
39	W706,S1468	Telephone cable box
40	W659,S1524	Storm drain manhole
41	W491,S1400	Intersection RR cut & drain line
42	W470,S1472	RR cut Mag 1000 gammas EM-5 mmhos
43	W449,S1538	RR cut Mag 400 gammas
44	W380,S1529	Mag 800 gammas EM-10 mmhos (15'dia.area pit?)
45	W328,S1546	Mag 700 gammas

*flags numbered out of sequence

Cont'd.

ANOMALY SITE #	SEARCH GRID COORDINATES (in feet)	DESCRIPTION OF SITE
46	W321,S1268	Sewer (?) manhole
47	W385,S1063	M-1 30 cal.clip full live ammo at 3 stakes
48	W463,S 982	Sm. hills Mag 500 gammas 100' dia. area wooden lids misc. metal
49	W443,S 859	Sm. hill Mag 400 gammas
50	W461,S 693	Sm. hills, lids-misc. ammo casings-ash 50'dia.circle
51	W371,S 682	Live ammo area
52	W366,S 786	Live ammo area
53	W348,S1088	Lead-numerous piles slugs & casings
54	W165,S1153	Piles slugs & casings 200' dia. circle
55	W 57,S1197	RR tracks & 0+00W 12+00S on grid slugs & casings to W
56	W102,S 777	Mag 250 gammas
57	W 75,S 673	Mag 500 gammas misc. metal
58	W 26,S 687	Water valve west edge of marine compound
59	W156,S 600	Misc. metal
60	W265,S 606	Live ammo M2 carbine? 25 cal.
61	W387,S 551	Live ammo 30 cal.
62	W378,S 404	Slugs in & under tar
63	W398,S 303	Cluster casings & slugs 50' dia. circle
64	W409,S 268	Drainage ditch
65	W298,N 51	Waterline EM-10 mmhos Mag 250 gammas
66	W250,S 53	Large lead pile EM-30 Mag 1200 gammas 50' dia. circle castings-nails
67	W254,S 71	Water valve North
68	W248,S 81	Water valve South
69	W190,S 316	Ashes 2' dia. circle
70	W150,S 353	Intersection drainage ditch & waterline
71	W195,S 506	Exploded ordinance site-sandbags-fuse-igniter
72	W 94,S 505	Waterline EM-30 mmhos
73	W 56,S 503	Misc. steel 3' dia. circle
74	W 26,S 391	Waste ditch calvert
75	W 84,S 359	Mag 800 gammas
76	W 43,S 269	Casings 3 stakes
77	W191,S 261	Sm. hill-slugs-drill rig decon area
78	W 36,S 176	Misc. metal 60' dia. circle
79	W 25,S 99	Misc. metal 30' dia. circle
80	W 43,S 82	Ash pile 5' dia. circle
81	W 69,S 27	Ash pile lead 5' dia. circle
82	W114,S 28	Waterline Mag 250 gammas EM-30 mmhos
83	W148,S 67	Metal discs 5' dia. circle

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APPENDIX B

SITE LOCATION BEARINGS AND DISTANCES

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TAD-North Area, Bldg. 539(SWMU 42) Geophysical Investigation

Anomaly Site Location: Bearing and distance from instrument base to anomaly site. Instrument base located 510 feet N70°W from chain link fence corner (see index map).

ANOMALY SITE #	BEARING	DISTANCE (feet)
Instrument Base	0	510
1	299° 55' 35"	194
2	290 45 10	283
3	311 02 45	275
4	344 41 40	367
5	343 57 20	384
6	351 56 55	478
7	354 10 40	592
8	357 29 15	742
9	355 20 20	811
10	355 47 50	849
11	355 49 40	875
12	353 57 15	857
13	352 53 20	826
14	348 53 35	884
15	347 12 30	826
16	346 28 20	802
17	342 14 35	847
18	339 26 20	807
19	334 08 40	773
20	338 57 05	684
21	336 07 50	590
22	335 40 20	576
23	317 13 30	553
24	284 19 30	331
25	264 35 40	299
26	246 43 00	262
27	188 03 00	358
28	175 59 25	298
29	164 11 30	244
30	116 46 20	221
31	101 34 40	230
32	104 40 15	494
33	100 53 35	601
34	98 14 10	719
35	98 28 55	906
36	98 16 05	990
37	94 26 50	1143
38	102 06 00	1185
39	98 45 20	1485
40	96 41 15	1534
41	90 27 19	1400
42	89 37 20	1472

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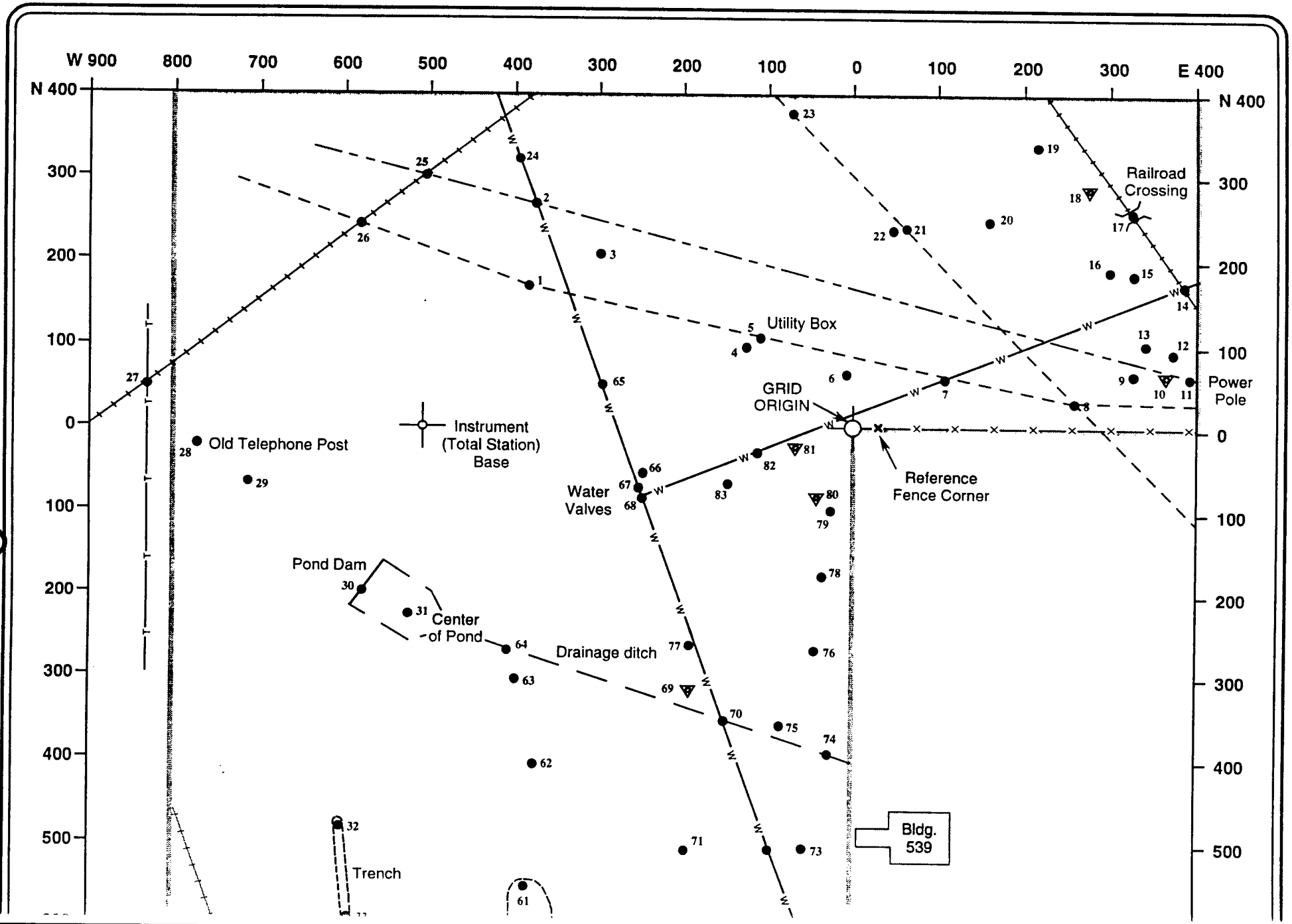
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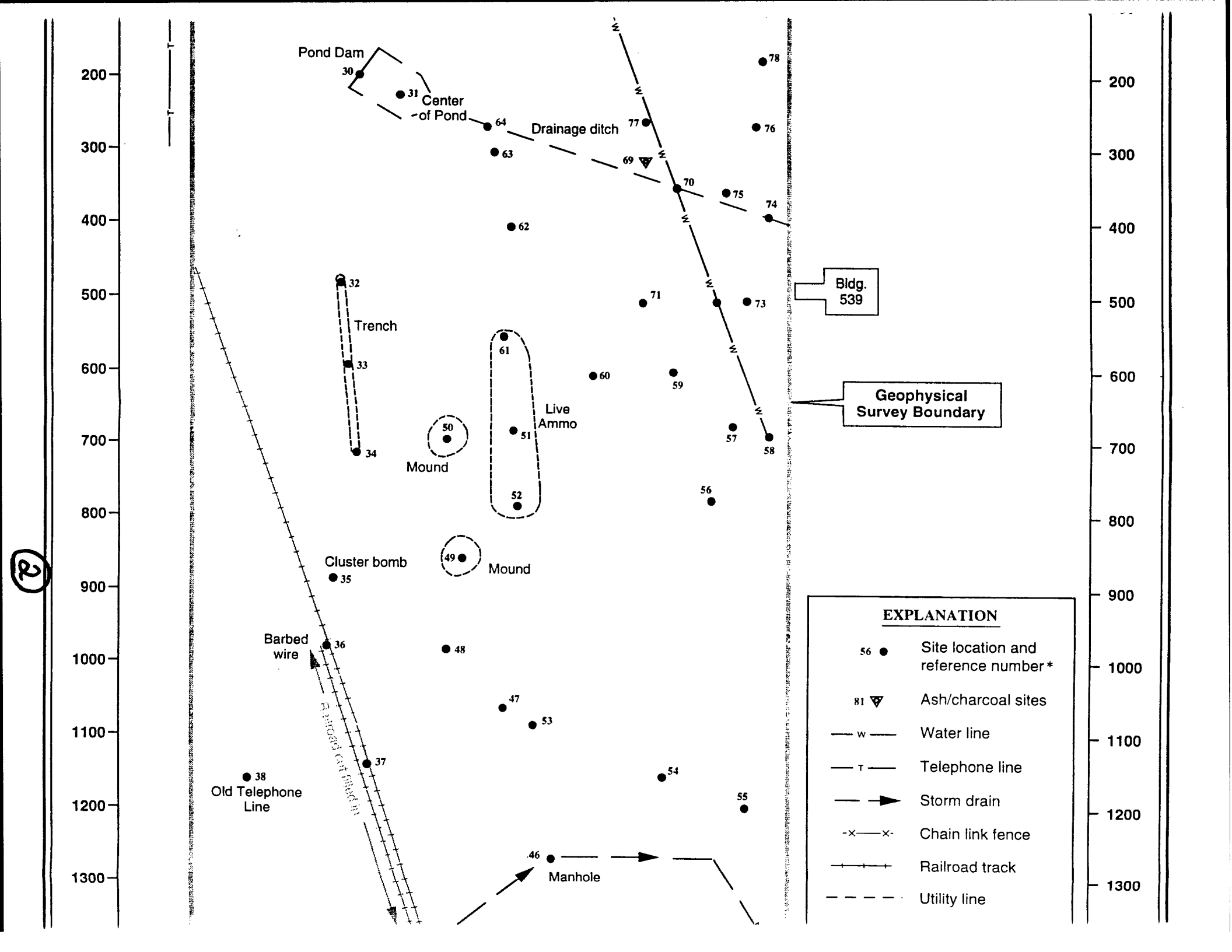
ANOMALY SITE #	BEARING	DISTANCE (feet)
43	88° 50' 30"	1538
44	86 15 30	1532
45	84 22 30	1553
46	82 50 30	1278
47	84 54 00	1067
48	89 01 40	982
49	87 30 25	860
50	88 24 12	693
51	80 57 45	691
52	81 45 05	794
53	83 03 35	1096
54	74 42 00	1195
55	70 31 40	1270
56	64 03 00	864
57	58 57 05	786
58	56 33 33	823
59	61 40 50	682
60	70 28 10	643
61	80 25 50	559
62	75 51 35	417
63	74 49 15	314
64	75 02 35	277
65	344 28 28	189
66	13 11 21	236
67	17 21 25	237
68	19 08 57	246
69	47 28 15	429
70	46 59 00	483
71	60 37 41	581
72	52 36 50	636
73	49 54 30	658
74	40 46 25	599
75	42 12 15	535
76	31 38 50	513
77	42 04 15	389
78	21 37 19	478
79	12 12 21	466
80	10 34 10	445
81	3 44 10	412
82	4 20 20	367
83	11 26 45	339

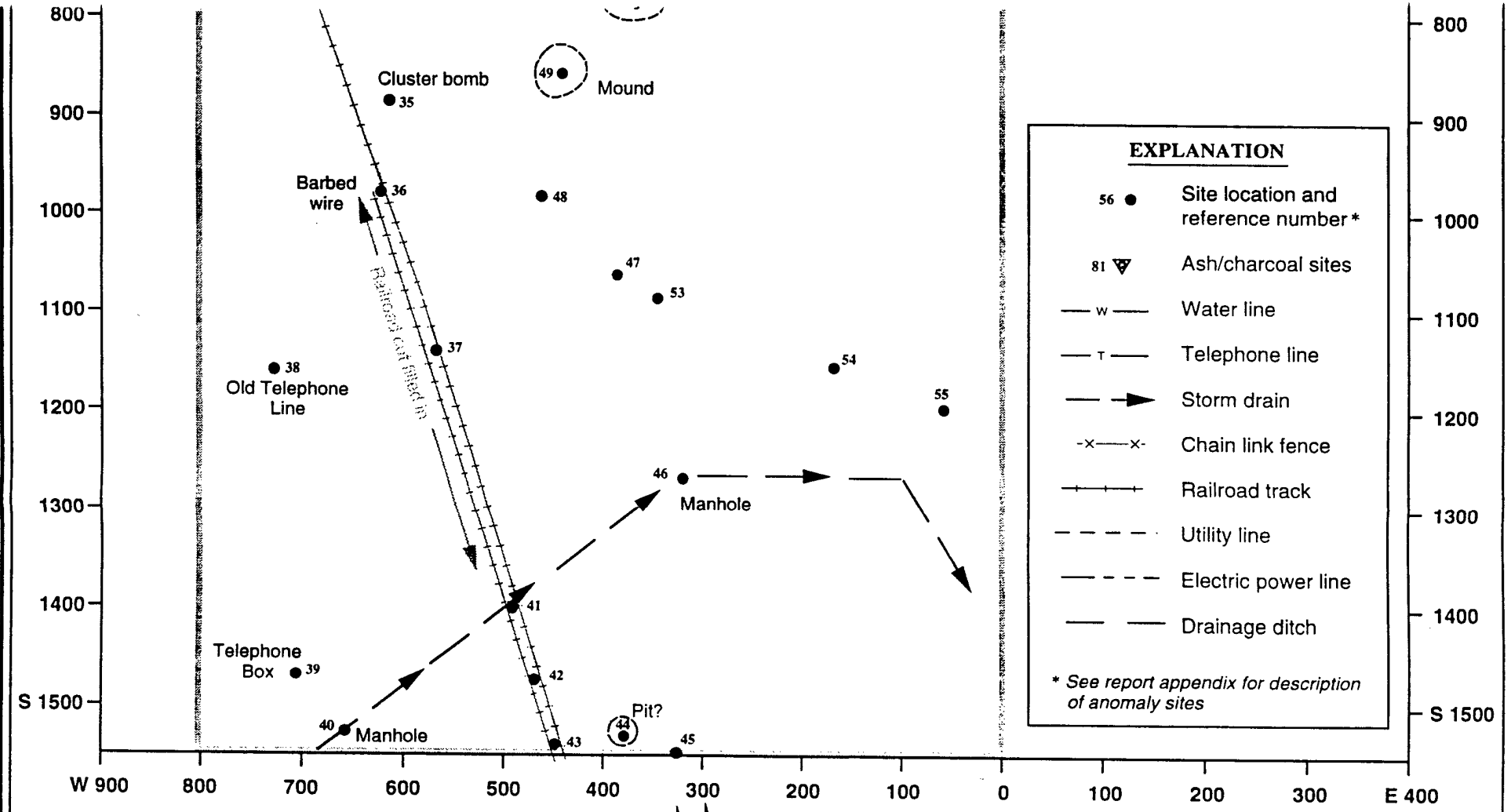
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PROJECT NO. 2942.0190




Pond Dam
Center of Pond
Drainage ditch
Trench
Mound
Live Ammo
Mound
Cluster bomb
Barbed wire
Old Telephone Line
Manhole
Bldg. 539
Geophysical Survey Boundary
EXPLANATION
Site location and reference number*
Ash/charcoal sites
Water line
Telephone line
Storm drain
Chain link fence
Railroad track
Utility line



Source: Practical Geophysics, Inc., May 1994

MONTGOMERY WATSON

TEAD-N RFI
SWMU 42
GEOPHYSICAL INVESTIGATION SITE
MAP SHOWING ANOMALY LOCATIONS
PLATE 1

APPENDIX G

X-RAY FLUORESCENCE FIELD SCREENING METHODOLOGY AND RESULTS

G.1 INTRODUCTION

G.1.0.1. This appendix presents the methodology and results of the x-ray fluorescence (XRF) activities conducted by Enviro Recovery Consultants (ERC) at SWMU 42 from October 8 to October 10, 1993. This technique allowed an approximately 160-acre area around the Bomb Washout Building (SWMU 42) to be field screened for the presence of elevated metals, particularly lead and strontium, in a time-efficient and economical manner.

G.1.0.2. Initially, only lead was considered a parameter of interest in the XRF investigation area, even though the instrument used for the field screening was capable of recording multiple analytes across a broad range of wavelengths. However, during the course of the XRF analyses, a prominent strontium peak was seen to be present in many of the submitted samples. This was discussed with Montgomery Watson personnel, and the decision was made to include strontium as an element of interest.

G.1.0.3. The results and calibration data for both lead and strontium are included in this appendix.

G.2 PURPOSE AND SCOPE OF ACTIVITIES

G.2.0.1. A total of 135 surface soil samples were field screened for lead and strontium from the area surrounding the Bomb Washout Building (see Figures 13-3 and 13-4 for sample locations and a summary of the results). The field screening was conducted to help in delineating the horizontal extent of metals contamination resulting from previous furnace stack emissions related to the former demilitarization furnace operations in this area.

G.2.0.2. Eight traverses were made, each 1500 feet in length, in the north, northwest, west, southwest, south, southeast, east, and northeast directions from a prominent central point (the large brick smokestack on the west side of Building 519). Surface soil samples were collected at 75-foot intervals along the traverses, except where the surface soil was covered by asphalt or otherwise inaccessible.

G.3 SAMPLING AND ANALYSIS PROCEDURES

G.3.0.1. Soil samples for XRF screening were collected with decontaminated stainless steel bowls and spoons in an identical manner to those collected for laboratory submittal. The homogenized soil sample was placed into a one quart "Ziploc" style plastic bag, labelled, and transported by the Montgomery field technician to the XRF operator.

G.3.0.2. The soil sample was prepared for analysis in the following manner:

- The sample was emptied from the bag onto a No. 100 sieve, and sieved onto a clean paper plate. This removed the coarse fractions and any debris (gravel, sticks, rootlets, etc.) that can cause inaccurate XRF readings

- The plate and soil were placed into a commercially available microwave oven and dried for a predetermined length of time. The soil sample was then allowed to cool

- The sample was then returned to the original "Ziploc" bag for analysis, minus the coarser fraction removed by the sieving process.

G.3.0.3. The XRF operator gently rolled the bag to physically mix the remaining soil fractions, which can separate during the preparation procedure. The sensor head of the XRF spectrometer was then placed onto the side of the sample bag, and the sample exposed for a predetermined period of time. The spectrum of the sample was then observed and recorded by the instrument. Even though only lead and strontium were calibrated for and reported, the XRF instrument recorded the emitted spectra over a wide range of wavelengths and can provide data on multiple analytes for future use, if needed.

G.3.0.4. To provide analytical confirmation of the XRF results, and to allow an instrument calibration curve to be generated, eight soil samples (about six percent) were submitted to ESE Laboratory for lead and strontium analyses. Also, approximately five percent of the XRF soil samples were analyzed in replicate; i.e., the XRF operator, after taking a reading on the soil sample, picked up the sample, rolled it over several times, and immediately obtained another (replicate) reading on it. These replicate results provided an indication of soil homogeneity and instrument variance.

BOMB WASHOUT BUILDING - SWMU 42
X-RAY FLUORESCENCE SCREENING RESULTS

Lead

Montgomery-Watson: Tooele Army Depot

PCXRF Pulp vs Lab: Pb = -5030.52 + 80.65011 PCXRF Count

Regression Output:

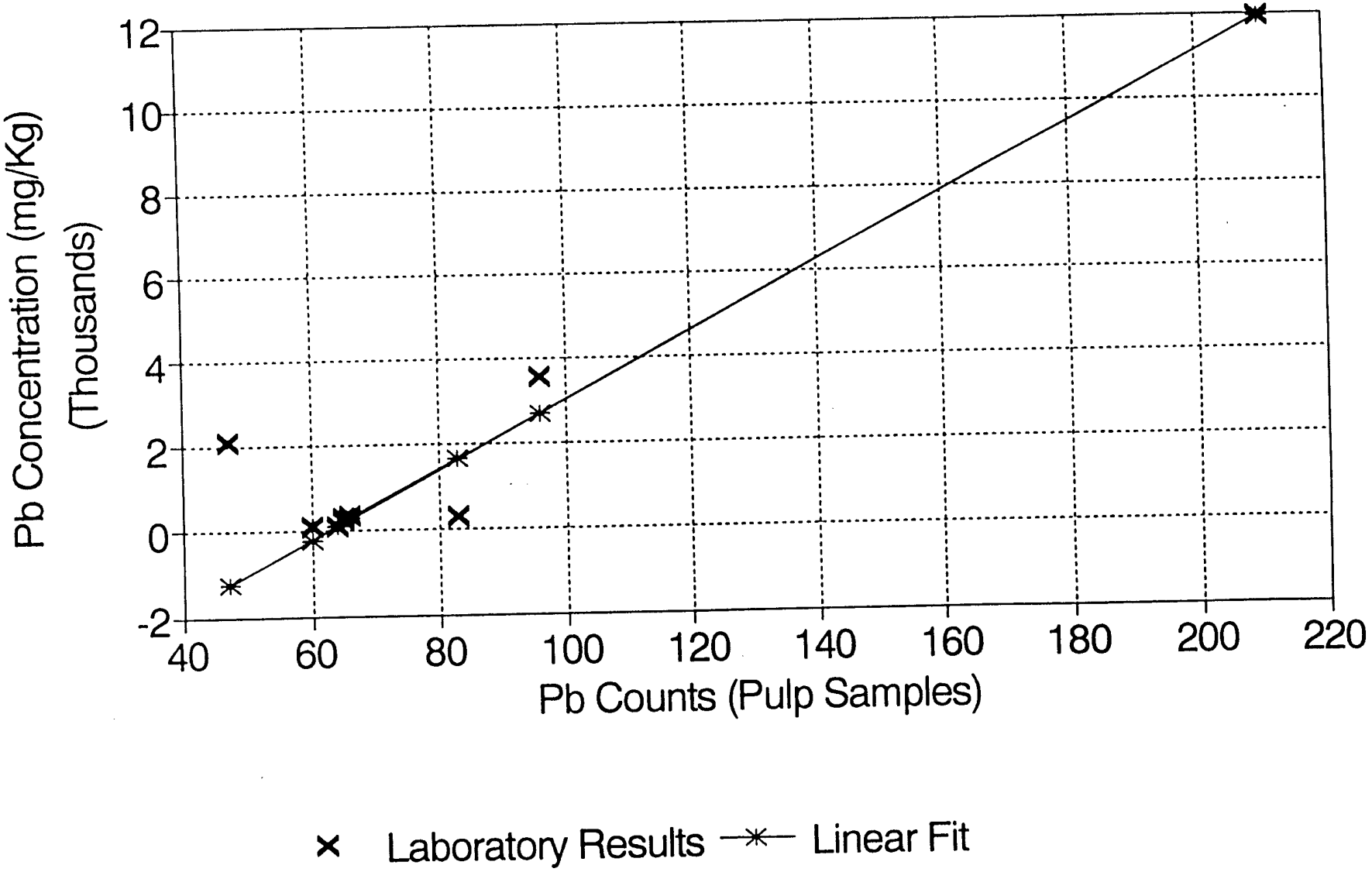
Constant	-5030.52
Std Err of Y Est	711.4823
R Squared	0.97792
No. of Observations	7
Degrees of Freedom	5

X Coefficient(s)	80.65011
Std Err of Coef.	5.419648

Sample	PCXRF Bulk Pb Count	Bulk Pb (mg/Kg)	PCXRF Pulp Pb Count	Pulp Pb (mg/Kg)	n	LAB Pb (mg/Kg)
NE825P	75	453	60	-192	1	129
EE300P	69	49	64	131	2	139
NW525P	65	-220	65	212	3	292
NNETR3	77	588	83	1663	4	354
WW600P	70	117	66	292	5	361
SW900P	100	2137	96	2712	6	3550
NW975P	233	11093	210	11906	7	11900
NN850P	137	4628	47	-1240	8	2120

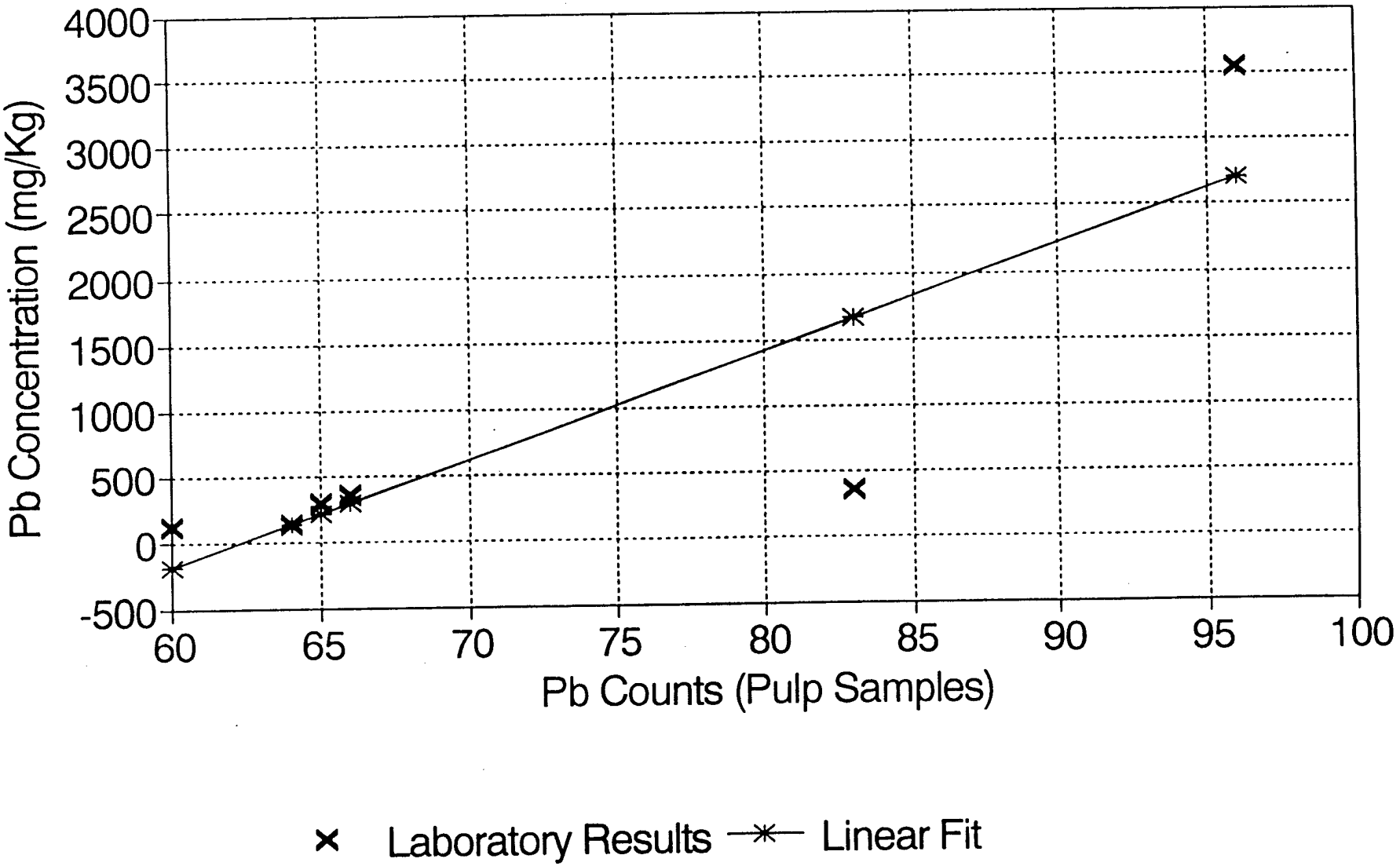
Montgomery-Watson: Tooele Army Depot

ATX-100 PCXRF Analysis vs Laboratory



Montgomery-Watson: Tooele Army Depot

ATX-100 PCXRF Analysis vs Laboratory



Montgomery-Watson: Tooele Army Depot

PCXRF Bulk vs Lab: Pb = -4597.1 + . 67.33874 PCXRF Count

Regression Output:

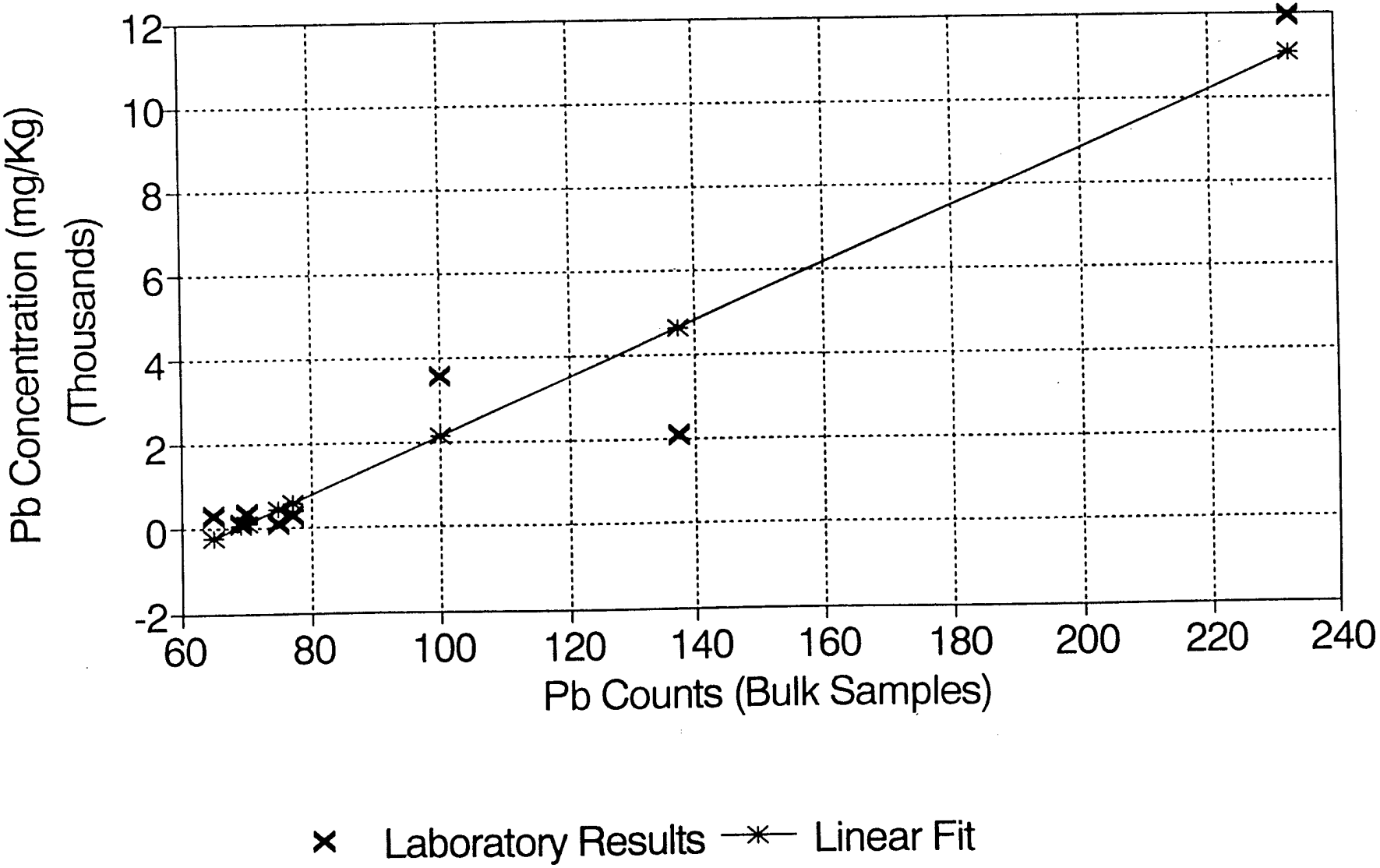
Constant	-4597.1
Std Err of Y Est	1253.679
R Squared	0.917777
No. of Observations	8
Degrees of Freedom	6

X Coefficient(s)	67.33874
Std Err of Coef.	8.228414

Sample	PCXRF Bulk Pb Count	Bulk Pb (mg/Kg)	PCXRF Pulp Pb Count	Pulp Pb (mg/Kg)	n	LAB Pb (mg/Kg)
NE825P	75	453	60	-192	1	129
EE300P	69	49	64	131	2	139
NW525P	65	-220	65	212	3	292
NNETR3	77	588	83	1663	4	354
WW600P	70	117	66	292	5	361
SW900P	100	2137	96	2712	6	3550
NW975P	233	11093	210	11906	7	11900
NN850P	137	4628	47	-1240	8	2120

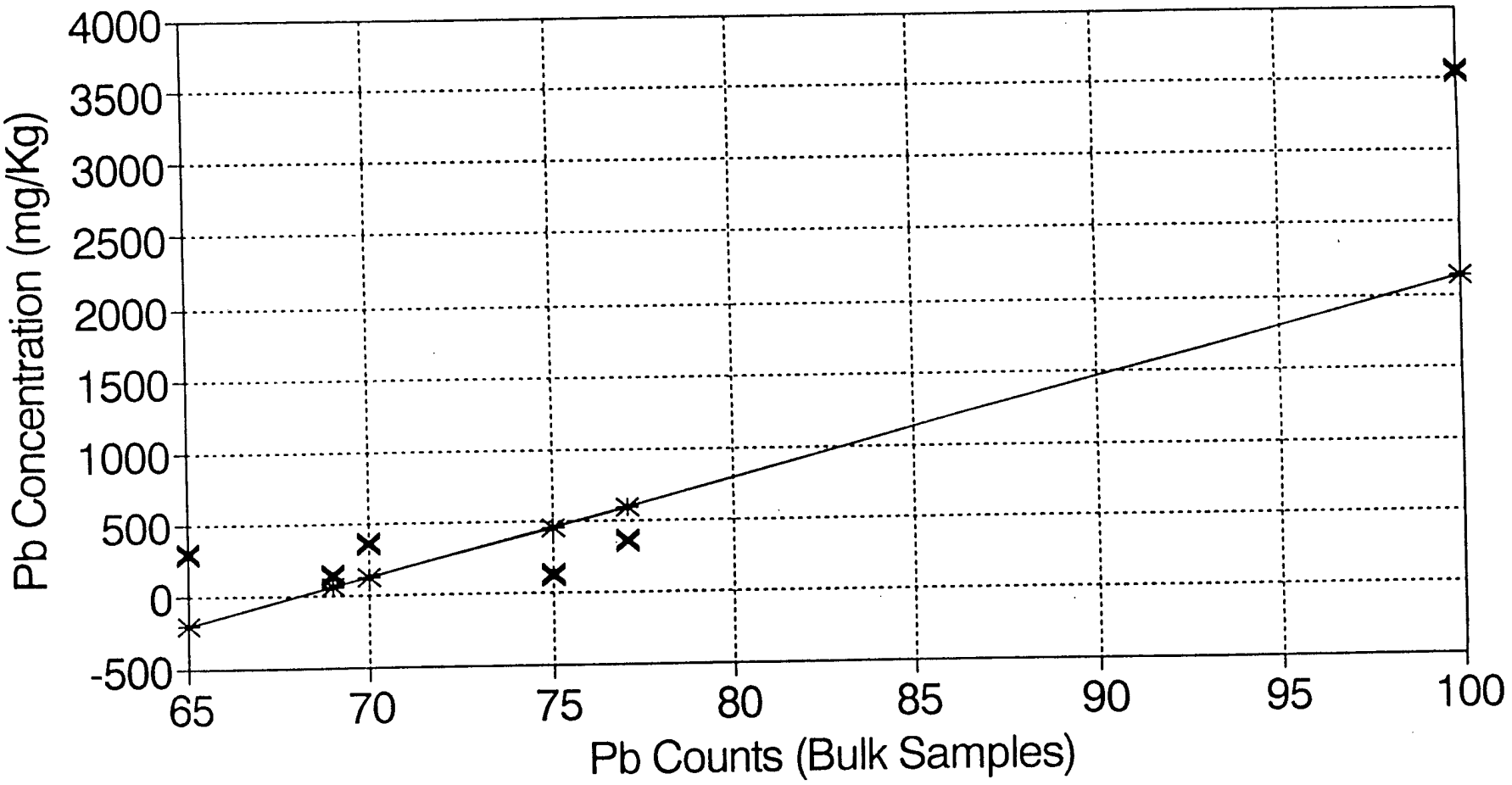
Montgomery-Watson: Tooele Army Depot

ATX-100 PCXRF Analysis vs Laboratory



Montgomery-Watson: Tooele Army Depot

ATX-100 PCXRF Analysis vs Laboratory



Sample	PCXRF Bulk Pb Count	Bulk Pb (mg/Kg)
NN0700	74	386
NN0775	94	1733
NN0850	137	4628
NN0925	77	588
NN1000	94	1733
NN1075	82	925
NN1150	78	655
NN1225	70	117
NN1300	77	588
NN1375	78	655
NN1450	70	117
NN1500	71	184
NW0375	80	790
NW0450	68	NA
NW0525	65	NA
NW0600	88	1329
NW0675	78	655
NW0750	72	251
NW0825	77	588
NW0900	85	1127
NW0975	233	11093
NW1050	67	NA
NW1125	69	49
NW1200	72	251
NW1275	69	49
NW1350	67	NA
NW1500	75	453
WW0375	74	386
WW0450	79	723
WW0525	74	386
WW0600	70	117
WW0675	81	857
WW0750	65	NA
WW0825	72	251
WW0900	74	386
WW0975	68	NA
WW1050	67	NA
WW1125	71	184
WW1200	70	117
WW1275	74	386

Sample	PCXRF Bulk Pb Count	Bulk Pb (mg/Kg)
WW1350	67	NA
WW1425	68	NA
WW1500	67	NA
SW0600	69	49
SW0675	66	NA
SW0750	67	NA
SW0825	71	184
SW0900	100	2137
SW1275	67	NA
SW1350	67	NA
SW1425	65	NA
SW1500	69	49
SS0075	67	NA
SS0150	67	NA
SS0225	70	117
SS0300	73	319
SS0375	71	184
SS0450	69	49
SS0525	70	117
SS0600	69	49
SS0750	70	117
SS0825	67	NA
SS0900	70	117
SS0975	75	453
SS1200	68	NA
SS1275	67	NA
SS1350	65	NA
SS1425	63	NA
SS1500	65	NA
SE0075	68	NA
SE0150	68	NA
SE0225	71	184
SE0300	71	184
SE0375	65	NA
SE0450	67	NA
SE0525	65	NA
SE0600	67	NA
SE0675	68	NA
SE0750	68	NA

Sample	PCXRF Bulk Pb Count	Bulk Pb (mg/Kg)
SE0900	66	NA
SE0975	63	NA
SE1050	65	NA
SE1125	66	NA
SE1200	65	NA
SE1275	65	NA
SE1350	68	NA
SE1425	67	NA
SE1500	69	49
EE0075	72	251
EE0150	68	NA
EE0225	66	NA
EE0300	69	49
EE0375	70	117
EE0450	66	NA
EE0525	67	NA
EE0600	67	NA
EE0675	66	NA
EE0750	67	NA
EE0845	68	NA
EE0900	69	49
EE0975	63	NA
EE1050	69	49
EE1125	69	49
EE1200	68	NA
EE1275	69	49
EE1350	70	117
EE1425	65	NA
EE1500	67	NA
NE0075	69	49
NE0150	66	NA
NE0225	67	NA
NE0300	63	NA
NE0375	64	NA
NE0450	62	NA
NE0525	69	49
NE0600	67	NA
NE0675	65	NA
NE0750	72	251
NE0825	75	453

Sample	PCXRF Bulk Pb Count	Bulk Pb (mg/Kg)
NE0900	73	319
NE0975	70	117
NE1050	70	117
NE1125	68	NA
NE1200	73	319
NE1275	70	117
NE1350	71	184
NE1425	68	NA
NE1500	72	251
TP0000	69	49
TPE000	75	453
NWRT1	69	49
TRANS	66	NA
NNETR2	87	1261
NNETR3	77	588
TR4	71	184

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery Watson: Tooele Army Depot

Isotope: Cd109 Date: 02/23/94

Filename	Date	XX	Pb
WW600P	101193	161.677	66
NNETR3P	101193	159.806	83
NN850P	101193	84.065	47
SW900P	101193	131.065	96
NW525P	101193	153.968	65
NE825P	101193	159.161	60
NW975P	101193	101.419	210
EE300P	101193	163.387	64

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery Watson: Tooele Army Depot

Isotope: Cd109 Date: 02/23/94

Filename	Date	XX	Pb
TP0000	100993	189.710	69

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery Watson: Tooele Army Depot

Isotope: Cd109 Date: 02/23/94

Filename	Date	XX	Pb
NN0700	100893	181.548	74
NN0775	100893	183.968	94
NN0850	100893	177.452	137
NN0925	100893	189.000	77
NN1000	100893	194.645	94
NN1075	100893	197.935	82
NN1150	100893	197.774	78
NN1225	100893	208.194	70
NN1300	100893	200.839	77
NN1375	100893	221.484	78
NN1450	100893	189.742	70
NN1500	100893	195.323	71

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery Watson: Tooele Army Depot

Isotope: Cd109 Date: 02/23/94

Filename	Date	XX	Pb
NW0450	100993	187.677	68
NW0525	100993	195.355	65
NW0600	100993	168.935	88
NW0675	100993	180.355	78
NW0750	100993	192.161	72
NW0825	100993	196.839	77
NW0900	100993	205.097	85
NW0975	100993	158.097	233
NW1050	100993	198.452	67
NW1125	100993	200.226	69
NW1200	100993	217.484	72
NW1275	100993	208.613	69
NW1350	100993	205.226	67
NW1500	100993	190.613	75

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery Watson: Tooele Army Depot

Isotope: Cd109 Date: 02/23/94

Filename	Date	XX	Pb
WW0375	100993	180.323	74
WW0450	100993	197.355	79
WW0525	100993	191.387	74
WW0600	100993	186.839	70
WW0675	100993	187.194	81
WW0750	100993	190.258	65
WW0825	100993	198.032	72
WW0900	100993	190.065	74
WW0975	100993	199.645	68
WW1050	100993	193.097	67
WW1125	100993	191.871	71
WW1200	100993	183.645	70
WW1275	100993	184.032	74
WW1350	100993	176.290	67
WW1425	100993	182.903	68
WW1500	100993	208.290	67

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery Watson: Tooele Army Depot

Isotope: Cd109 Date: 02/23/94

Filename	Date	XX	Pb
NW0375	100993	187.290	80
SW0600	100993	179.258	69
SW0675	100993	180.935	66
SW0750	100993	193.968	67
SW0825	100993	190.516	71
SW0900	100993	154.935	100
SW1275	100993	196.742	67
SW1350	100993	187.097	67
SW1425	100993	174.000	65
SW1500	100993	191.419	69

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery Watson: Tooele Army Depot

Isotope: Cd109 Date: 02/23/94

Filename	Date	XX	Pb
NE0075	100993	165.226	69
NE0150	100993	164.065	66
NE0225	100993	169.000	67
NE0300	100993	156.581	63
NE0375	100993	162.452	64
NE0450	100993	153.613	62
NE0525	100993	170.387	69
NE0600	100993	160.226	67
NE0675	100993	161.290	65
NE0750	100993	201.258	72
NE0825	100993	210.710	75
NE0900	100993	210.516	73
NE0975	100993	210.097	70
NE1050	100993	210.161	70
NE1125	100993	187.194	68
NE1200	100993	216.645	73

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery Watson: Tooele Army Depot

Isotope: Cd109 Date: 02/23/94

Filename	Date	XX	Pb
NE1275	100993	198.581	70
NE1350	100993	209.677	71
NE1425	100993	200.613	68
NE1500	100993	202.903	72

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery Watson: Tooele Army Depot

Isotope: Cd109 Date: 02/23/94

Filename	Date	XX	Pb
EE0075	101093	210.258	72
EE0150	101093	206.452	68
EE0225	101093	192.065	66
EE0300	101093	191.387	69
EE0375	101093	196.871	70
EE0450	101093	206.484	66
EE0525	101093	207.032	67
EE0600	101093	196.355	67
EE0675	101093	198.484	66
EE0750	101093	203.419	67
EE0845	101093	210.839	68
EE0900	101093	187.548	69
EE0975	101093	200.290	63
EE1050	101093	202.000	69
EE1125	101093	199.516	69
EE1200	101093	222.871	68
EE1275	101093	202.645	69
EE1350	101093	191.613	70
EE1425	101093	195.226	65
EE1500	101093	206.290	67

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery Watson: Tooele Army Depot

Isotope: Cd109 Date: 02/23/94

Filename	Date	XX	Pb
SE0075	101093	198.129	68
SE0150	101093	206.129	68
SE0225	101093	189.258	71
SE0300	101093	208.548	71
SE0375	101093	211.839	65
SE0450	101093	197.871	67
SE0525	101093	191.677	65
SE0600	101093	198.774	67
SE0675	101093	195.032	68
SE0750	101093	197.581	68
SE0900	101093	197.581	66
SE0975	101093	179.548	63
SE1050	101093	192.290	65
SE1125	101093	210.516	66
SE1200	101093	191.194	65
SE1275	101093	197.258	65
SE1350	101093	194.258	68
SE1425	101093	197.742	67
SE1500	101093	202.581	69

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery Watson: Tooele Army Depot

Isotope: Cd109 Date: 02/23/94

Filename	Date	XX	Pb
SS0075	101093	209.097	67
SS0150	101093	196.161	67
SS0225	101093	194.839	70
SS0300	101093	206.806	73
SS0375	101093	192.258	71
SS0450	101093	198.516	69
SS0525	101093	206.194	70
SS0600	101093	209.677	69
SS0750	101093	186.645	70
SS0825	101093	200.516	67
SS0900	101093	199.226	70
SS0975	101093	194.323	75
SS1200	101093	191.387	68
SS1275	101093	190.032	67
SS1350	101093	184.806	65
SS1425	101093	180.032	63
SS1500	101093	165.871	65

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery Watson: Tooele Army Depot

Isotope: Cd109 Date: 02/23/94

Filename	Date	XX	Pb
TPE000	101093	196.065	75
NWRT1	101093	167.452	69
TRANS	101093	175.258	66
NNETR2	101093	164.452	87
NNETR3	101093	193.387	77
TR4	101093	166.000	71

BOMB WASHOUT BUILDING - SWMU 42
X-RAY FLUORESCENCE SCREENING RESULTS

Strontium

Montgomery-Watson: Tooele Army Depot

File: SRCAL

SMPL	Sr PCXRF Count	Sr LAB mg/Kg	Sr Fit-1 mg/Kg
EE300P	27	19.2	NA
NE825P	29	26.6	NA
NW525P	34	158.0	NA
WW600P	35	129.0	19.3
NN850P	38	965.0	110.3
SW900P	49	452.0	444.1
NNETR3	314	5560.0	8485.6
NW975P	639	19700.0	18347.7

Regression Output:

Constant		-1042.76
Std Err of Y Est		1369.52
R Squared		0.965794
No. of Observations		8
Degrees of Freedom		6
X Coefficient(s)	30.34497	
Std Err of Coef.	2.331423	

SMPL			(Fit-2)
EE300P	27	19.2	68.7
NE825P	29	26.6	122.2
NW525P	34	158.0	256.0
WW600P	35	129.0	282.7
NN850P	38	965.0	363.0
SW900P	49	452.0	657.3

Regression Output:

Constant		-653.634
Std Err of Y Est		335.1786
R Squared		0.327187
No. of Observations		6
Degrees of Freedom		4
X Coefficient(s)	26.75284	
Std Err of Coef.	19.18179	

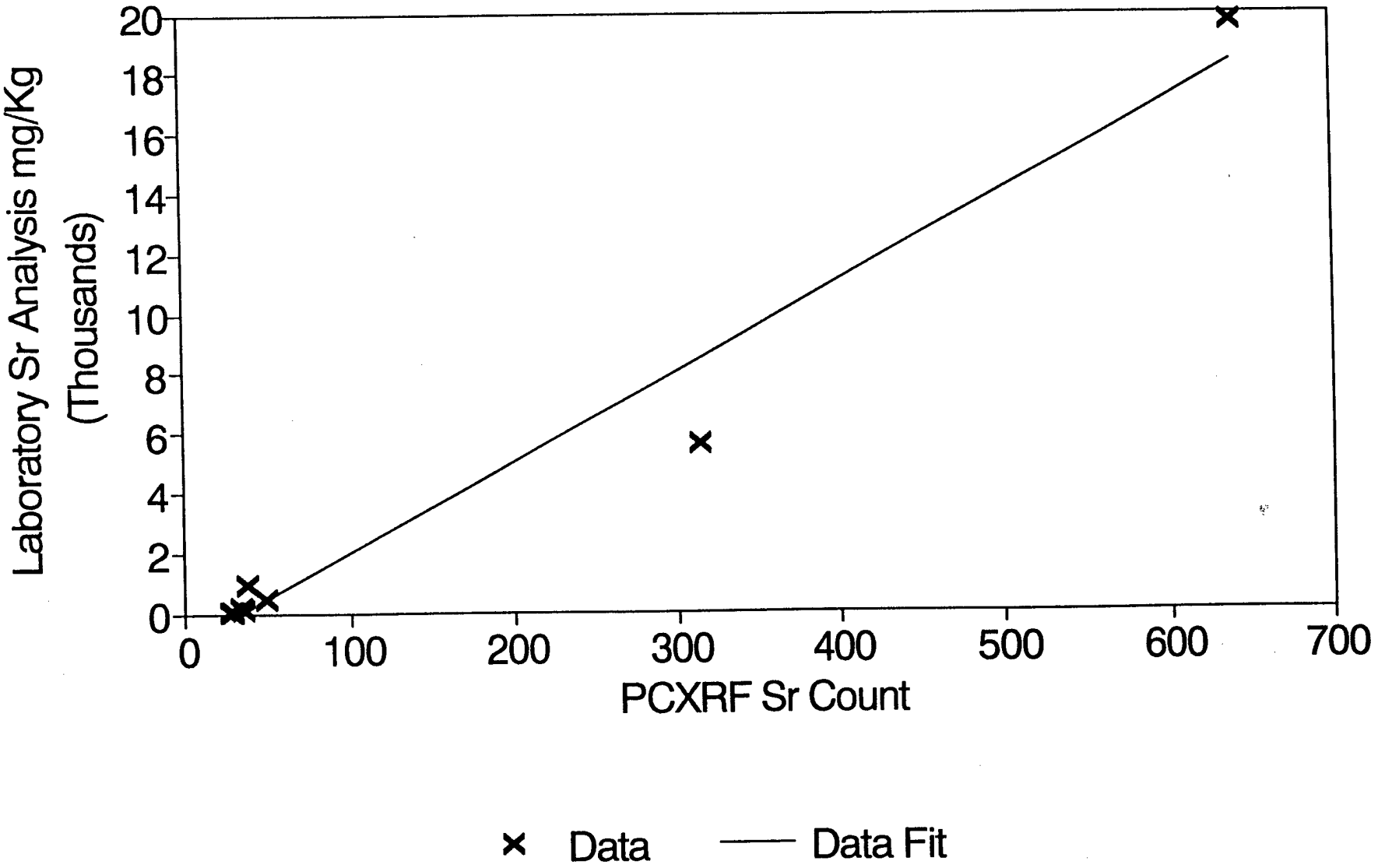
SMPL			(Fit-3)
EE300P	27	19.2	NA
NE825P	29	26.6	39.4
NW525P	34	158.0	140.8
WW600P	35	129.0	161.0
SW900P	49	452.0	444.7

Regression Output:

Constant		-548.157
Std Err of Y Est		25.5096
R Squared		0.984231
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	20.26199	
Std Err of Coef.	1.480716	

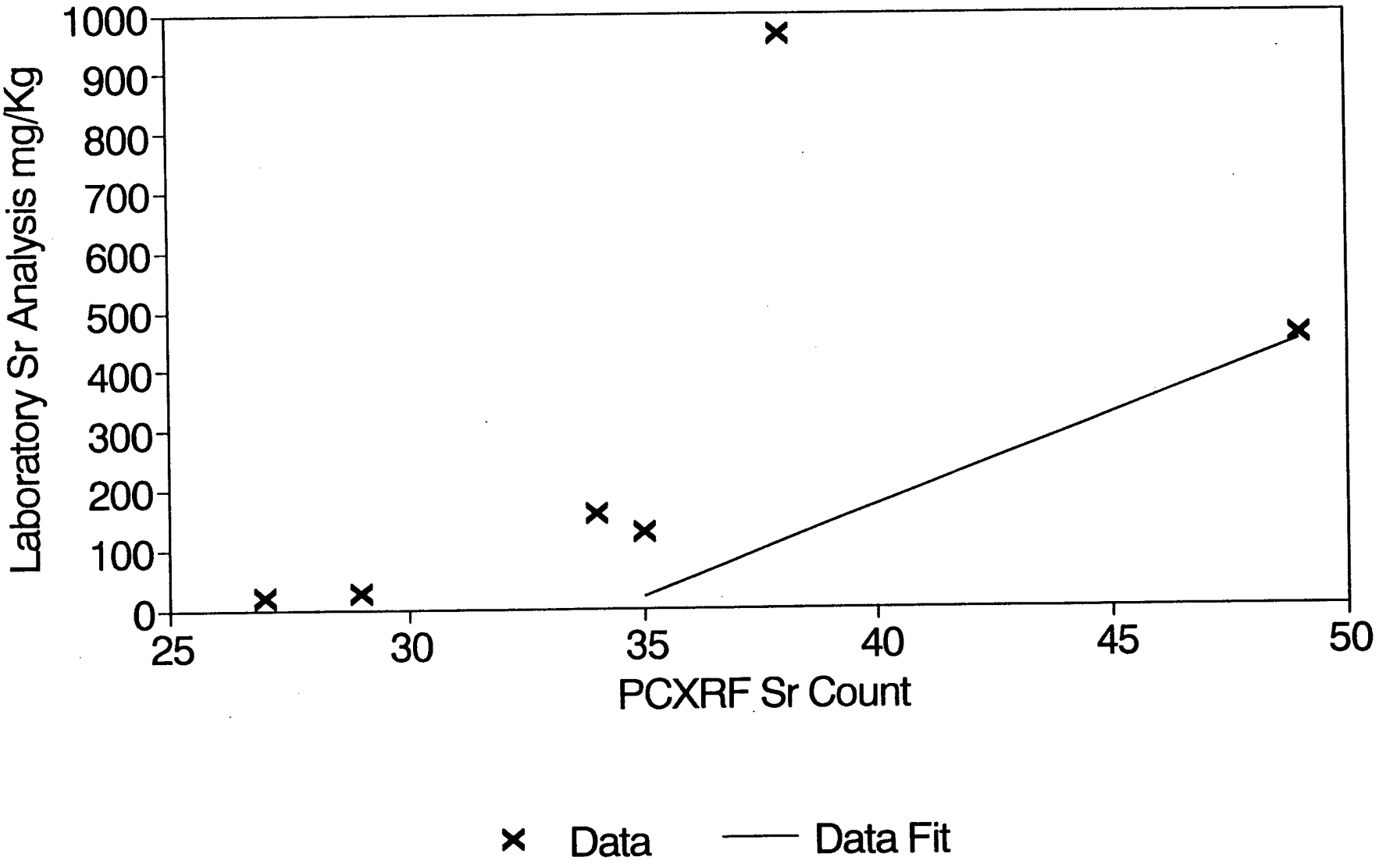
Montgomery-Watson: Tooele Army Depot

ATX-100 PCXRF Calibration for Sr



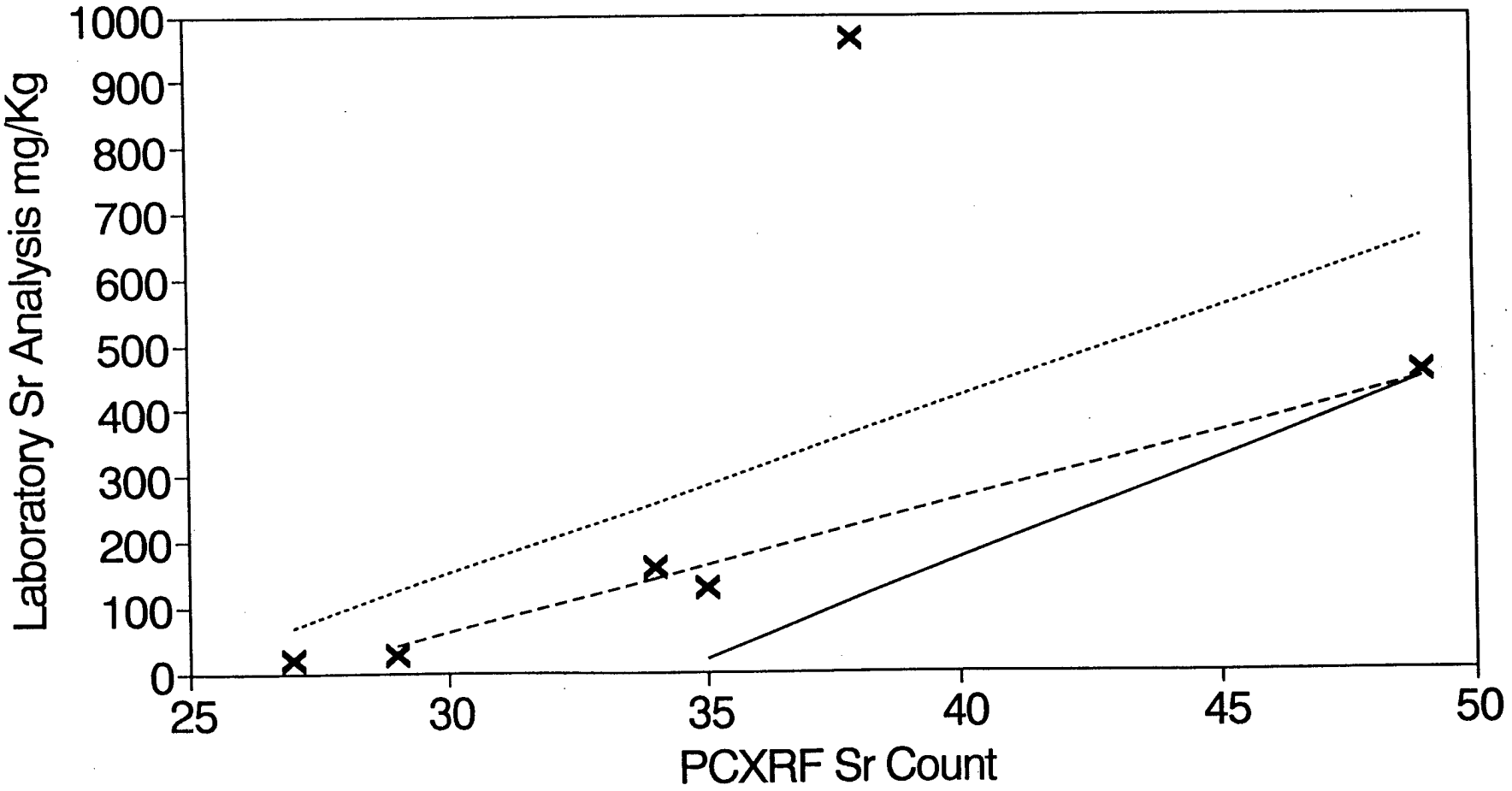
Montgomery-Watson: Tooele Army Depot

ATX-100 PCXRF Calibration for Sr



Montgomery-Watson: Tooele Army Depot

ATX-100 PCXRF Calibration for Sr



Enviro-Recovery Consultants, Inc. File: MWTADSR
ATX-100 Analysis Results for
Montgomery-Watson: Tooele Army Depot.

Filename	Date	XX	Sr PCXRF Count	Sr Fit-1 mg/Kg	Sr Fit-3 mg/Kg	Pb PCXRF Count
NN0700	100893	181.548	63	869	728	74
NN0775	100893	183.968	91	1719	1296	94
NN0850	100893	177.452	145	3357	2390	137
NN0925	100893	189.000	53	566	526	77
NN1000	100893	194.645	59	748	647	94
NN1075	100893	197.935	47	383	404	82
NN1150	100893	197.774	47	383	404	78
NN1225	100893	208.194	44	292	343	70
NN1300	100893	200.839	41	201	283	77
NN1375	100893	221.484	45	323	364	78
NN1450	100893	189.742	37	80	202	70
NN1500	100893	195.323	37	80	202	71
NW0375	100993	187.290	84	1506	1154	80
NW0450	100993	187.677	40	171	262	68
NW0525	100993	195.355	38	110	222	65
NW0600	100993	168.935	85	1537	1174	88
NW0675	100993	180.355	58	717	627	78
NW0750	100993	192.161	36	50	181	72
NW0825	100993	196.839	45	323	364	77
NW0900	100993	205.097	59	748	647	85
NW0975	100993	158.097	400	11095	7557	233
NW1050	100993	198.452	35	19	161	67
NW1125	100993	200.226	34	-11	141	69
NW1200	100993	217.484	37	80	202	72
NW1275	100993	208.613	35	19	161	69
NW1350	100993	205.226	33	-41	120	67
NW1500	100993	190.613	36	50	181	75
WW0375	100993	180.323	35	19	161	74
WW0450	100993	197.355	41	201	283	79
WW0525	100993	191.387	37	80	202	74
WW0600	100993	186.839	42	232	303	70
WW0675	100993	187.194	46	353	384	81
WW0750	100993	190.258	38	110	222	65
WW0825	100993	198.032	39	141	242	72
WW0900	100993	190.065	38	110	222	74
WW0975	100993	199.645	38	110	222	68

Enviro-Recovery Consultants, Inc. File: MWTADSR
ATX-100 Analysis Results for
Montgomery-Watson: Tooele Army Depot.

Filename	Date	XX	Sr PCXRF Count	Sr Fit-1 mg/Kg	Sr Fit-3 mg/Kg	Pb PCXRF Count
WW1050	100993	193.097	35	19	161	67
WW1125	100993	191.871	39	141	242	71
WW1200	100993	183.645	37	80	202	70
WW1275	100993	184.032	37	80	202	74
WW1350	100993	176.290	37	80	202	67
WW1425	100993	182.903	38	110	222	68
WW1500	100993	208.290	40	171	262	67
SW0600	100993	179.258	38	110	222	69
SW0675	100993	180.935	37	80	202	66
SW0750	100993	193.968	35	19	161	67
SW0825	100993	190.516	36	50	181	71
SW0900	100993	154.935	50	474	465	100
SW1275	100993	196.742	34	-11	141	67
SW1350	100993	187.097	36	50	181	67
SW1425	100993	174.000	34	-11	141	65
SW1500	100993	191.419	35	19	161	69
SS0075	101093	209.097	39	141	242	67
SS0150	101093	196.161	35	19	161	67
SS0225	101093	194.839	36	50	181	70
SS0300	101093	206.806	40	171	262	73
SS0375	101093	192.258	36	50	181	71
SS0450	101093	198.516	36	50	181	69
SS0525	101093	206.194	34	-11	141	70
SS0600	101093	209.677	38	110	222	69
SS0750	101093	186.645	35	19	161	70
SS0825	101093	200.516	36	50	181	67
SS0900	101093	199.226	36	50	181	70
SS0975	101093	194.323	35	19	161	75
SS1200	101093	191.387	35	19	161	68
SS1275	101093	190.032	39	141	242	67
SS1350	101093	184.806	36	50	181	65
SS1425	101093	180.032	37	80	202	63
SS1500	101093	165.871	33	-41	120	65
SE0075	101093	198.129	37	80	202	68
SE0150	101093	206.129	37	80	202	68

Enviro-Recovery Consultants, Inc. File: MWTADSR
ATX-100 Analysis Results for
Montgomery-Watson: Tooele Army Depot.

Filename	Date	XX	Sr PCXRF Count	Sr Fit-1 mg/Kg	Sr Fit-3 mg/Kg	Pb PCXRF Count
SE0225	101093	189.258	35	19	161	71
SE0300	101093	208.548	34	-11	141	71
SE0375	101093	211.839	36	50	181	65
SE0450	101093	197.871	33	-41	120	67
SE0525	101093	191.677	36	50	181	65
SE0600	101093	198.774	31	-102	80	67
SE0675	101093	195.032	33	-41	120	68
SE0750	101093	197.581	33	-41	120	68
SE0900	101093	197.581	40	171	262	66
SE0975	101093	179.548	37	80	202	63
SE1050	101093	192.290	35	19	161	65
SE1125	101093	210.516	33	-41	120	66
SE1200	101093	191.194	37	80	202	65
SE1275	101093	197.258	37	80	202	65
SE1350	101093	194.258	34	-11	141	68
SE1425	101093	197.742	35	19	161	67
SE1500	101093	202.581	38	110	222	69
EE0075	101093	210.258	39	141	242	72
EE0150	101093	206.452	37	80	202	68
EE0225	101093	192.065	35	19	161	66
EE0300	101093	191.387	36	50	181	69
EE0375	101093	196.871	36	50	181	70
EE0450	101093	206.484	35	19	161	66
EE0525	101093	207.032	37	80	202	67
EE0600	101093	196.355	38	110	222	67
EE0675	101093	198.484	38	110	222	66
EE0750	101093	203.419	38	110	222	67
EE0845	101093	210.839	37	80	202	68
EE0900	101093	187.548	36	50	181	69
EE0975	101093	200.290	34	-11	141	63
EE1050	101093	202.000	39	141	242	69
EE1125	101093	199.516	37	80	202	69
EE1200	101093	222.871	36	50	181	68
EE1275	101093	202.645	40	171	262	69
EE1350	101093	191.613	40	171	262	70
EE1425	101093	195.226	38	110	222	65
EE1500	101093	206.290	41	201	283	67

Enviro-Recovery Consultants, Inc. File: MWTADSR
ATX-100 Analysis Results for
Montgomery-Watson: Tooele Army Depot.

Filename	Date	XX	Sr PCXRF Count	Sr Fit-1 mg/Kg	Sr Fit-3 mg/Kg	Pb PCXRF Count
NE0075	100993	165.226	37	80	202	69
NE0150	100993	164.065	38	110	222	66
NE0225	100993	169.000	40	171	262	67
NE0300	100993	156.581	41	201	283	63
NE0375	100993	162.452	41	201	283	64
NE0450	100993	153.613	39	141	242	62
NE0525	100993	170.387	41	201	283	69
NE0600	100993	160.226	42	232	303	67
NE0675	100993	161.290	43	262	323	65
NE0750	100993	201.258	37	80	202	72
NE0825	100993	210.710	42	232	303	75
NE0900	100993	210.516	39	141	242	73
NE0975	100993	210.097	37	80	202	70
NE1050	100993	210.161	36	50	181	70
NE1125	100993	187.194	35	19	161	68
NE1200	100993	216.645	41	201	283	73
NE1275	100993	198.581	40	171	262	70
NE1350	100993	209.677	40	171	262	71
NE1425	100993	200.613	37	80	202	68
NE1500	100993	202.903	39	141	242	72
NNETR2	101093	164.452	83	1476	1134	87
NNETR3	101093	193.387	173	4207	2957	77
NWRT1	101093	167.452	54	596	546	69
TPE000	101093	196.065	43	262	323	75
TR4	101093	166.000	37	80	202	71
TRANS	101093	175.258	35	19	161	66
TP0000	100993	189.710	43	262	323	69

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery-Watson: Tooele Army Depot

Isotope: Cd109 Date: 04/01/94

Filename	Date	XX	Sr	Pb
WW600P	101193	161.677	35	66
NNETR3P	101193	159.806	314	83
NN850P	101193	84.065	38	47
SW900P	101193	131.065	49	96
NW525P	101193	153.968	34	65
NE825P	101193	159.161	29	60
NW975P	101193	101.419	639	210
EE300P	101193	163.387	27	64

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery-Watson: Tooele Army Depot

Isotope: Cd109 Date: 04/01/94

Filename	Date	XX	Sr	Pb
NN0700	100893	181.548	63	74
NN0775	100893	183.968	91	94
NN0850	100893	177.452	145	137
NN0925	100893	189.000	53	77
NN1000	100893	194.645	59	94
NN1075	100893	197.935	47	82
NN1150	100893	197.774	47	78
NN1225	100893	208.194	44	70
NN1300	100893	200.839	41	77
NN1375	100893	221.484	45	78
NN1450	100893	189.742	37	70
NN1500	100893	195.323	37	71

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery-Watson: Tooele Army Depot

Isotope: Cd109 Date: 04/01/94

Filename	Date	XX	Sr	Pb
NW0375	100993	187.290	84	80
NW0450	100993	187.677	40	68
NW0525	100993	195.355	38	65
NW0600	100993	168.935	85	88
NW0675	100993	180.355	58	78
NW0750	100993	192.161	36	72
NW0825	100993	196.839	45	77
NW0900	100993	205.097	59	85
NW0975	100993	158.097	400	233
NW1050	100993	198.452	35	67
NW1125	100993	200.226	34	69
NW1200	100993	217.484	37	72
NW1275	100993	208.613	35	69
NW1350	100993	205.226	33	67
NW1500	100993	190.613	36	75

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery-Watson: Tooele Army Depot

Isotope: Cd109 Date: 04/01/94

Filename	Date	XX	Sr	Pb
WW0375	100993	180.323	35	74
WW0450	100993	197.355	41	79
WW0525	100993	191.387	37	74
WW0600	100993	186.839	42	70
WW0675	100993	187.194	46	81
WW0750	100993	190.258	38	65
WW0825	100993	198.032	39	72
WW0900	100993	190.065	38	74
WW0975	100993	199.645	38	68
WW1050	100993	193.097	35	67
WW1125	100993	191.871	39	71
WW1200	100993	183.645	37	70
WW1275	100993	184.032	37	74
WW1350	100993	176.290	37	67
WW1425	100993	182.903	38	68
WW1500	100993	208.290	40	67

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery-Watson: Tooele Army Depot

Isotope: Cd109 Date: 04/01/94

Filename	Date	XX	Sr	Pb
SW0600	100993	179.258	38	69
SW0675	100993	180.935	37	66
SW0750	100993	193.968	35	67
SW0825	100993	190.516	36	71
SW0900	100993	154.935	50	100
SW1275	100993	196.742	34	67
SW1350	100993	187.097	36	67
SW1425	100993	174.000	34	65
SW1500	100993	191.419	35	69

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery-Watson: Tooele Army Depot

Isotope: Cd109 Date: 04/01/94

Filename	Date	XX	Sr	Pb
SS0075	101093	209.097	39	67
SS0150	101093	196.161	35	67
SS0225	101093	194.839	36	70
SS0300	101093	206.806	40	73
SS0375	101093	192.258	36	71
SS0450	101093	198.516	36	69
SS0525	101093	206.194	34	70
SS0600	101093	209.677	38	69
SS0750	101093	186.645	35	70
SS0825	101093	200.516	36	67
SS0900	101093	199.226	36	70
SS0975	101093	194.323	35	75
SS1200	101093	191.387	35	68
SS1275	101093	190.032	39	67
SS1350	101093	184.806	36	65
SS1425	101093	180.032	37	63
SS1500	101093	165.871	33	65

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery-Watson: Tooele Army Depot

Isotope: Cd109 Date: 04/01/94

Filename	Date	XX	Sr	Pb
SE0075	101093	198.129	37	68
SE0150	101093	206.129	37	68
SE0225	101093	189.258	35	71
SE0300	101093	208.548	34	71
SE0375	101093	211.839	36	65
SE0450	101093	197.871	33	67
SE0525	101093	191.677	36	65
SE0600	101093	198.774	31	67
SE0675	101093	195.032	33	68
SE0750	101093	197.581	33	68
SE0900	101093	197.581	40	66
SE0975	101093	179.548	37	63
SE1050	101093	192.290	35	65
SE1125	101093	210.516	33	66
SE1200	101093	191.194	37	65
SE1275	101093	197.258	37	65
SE1350	101093	194.258	34	68
SE1425	101093	197.742	35	67
SE1500	101093	202.581	38	69

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery-Watson: Tooele Army Depot

Isotope: Cd109 Date: 04/01/94

Filename	Date	XX	Sr	Pb
EE0075	101093	210.258	39	72
EE0150	101093	206.452	37	68
EE0225	101093	192.065	35	66
EE0300	101093	191.387	36	69
EE0375	101093	196.871	36	70
EE0450	101093	206.484	35	66
EE0525	101093	207.032	37	67
EE0600	101093	196.355	38	67
EE0675	101093	198.484	38	66
EE0750	101093	203.419	38	67
EE0845	101093	210.839	37	68
EE0900	101093	187.548	36	69
EE0975	101093	200.290	34	63
EE1050	101093	202.000	39	69
EE1125	101093	199.516	37	69
EE1200	101093	222.871	36	68
EE1275	101093	202.645	40	69
EE1350	101093	191.613	40	70
EE1425	101093	195.226	38	65
EE1500	101093	206.290	41	67

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery-Watson: Tooele Army Depot

Isotope: Cd109 Date: 04/01/94

Filename	Date	XX	Sr	Pb
NE0075	100993	165.226	37	69
NE0150	100993	164.065	38	66
NE0225	100993	169.000	40	67
NE0300	100993	156.581	41	63
NE0375	100993	162.452	41	64
NE0450	100993	153.613	39	62
NE0525	100993	170.387	41	69
NE0600	100993	160.226	42	67
NE0675	100993	161.290	43	65
NE0750	100993	201.258	37	72
NE0825	100993	210.710	42	75
NE0900	100993	210.516	39	73
NE0975	100993	210.097	37	70
NE1050	100993	210.161	36	70
NE1125	100993	187.194	35	68
NE1200	100993	216.645	41	73
NE1275	100993	198.581	40	70
NE1350	100993	209.677	40	71
NE1425	100993	200.613	37	68
NE1500	100993	202.903	39	72

A T X - 1 0 0 S A M P L E R E P O R T

by Enviro-Recovery Consultants, Inc.

for Montgomery-Watson: Tooele Army Depot

Isotope: Cd109 Date: 04/01/94

Filename	Date	XX	Sr	Pb
NNETR2	101093	164.452	83	87
NNETR3	101093	193.387	173	77
NWRT1	101093	167.452	54	69
TPE000	101093	196.065	43	75
TR4	101093	166.000	37	71
TRANS	101093	175.258	35	66
TP0000	100993	189.710	43	69

APPENDIX H

AIR SAMPLING AND METEOROLOGICAL MONITORING METHODOLOGY AND DATA

H.1 INTRODUCTION

H.1.0.1. Presented in this appendix is the final report prepared by North American Weather Consultants (NAWC) summarizing the air sampling and meteorological monitoring activities at the Bomb Washout Building (SWMU 42) during October–December 1993. Air monitoring was conducted from four locations at this SWMU to assess the potential for airborne releases of contaminants from local soils. Because metals are the primary contaminants of concern at this site, the monitoring program measured airborne particulate metals.

H.1.0.2. This report consists of an introduction, site description, summary descriptions of the equipment and methodology used to collect the total suspended particulates (TSP) filter samples, TSP results, and a description of the concurrent meteorological monitoring at SWMU 42. Appended to the report are detailed descriptions of the procedure and equipment used, and laboratory analytical results.

H.1.0.3. The following paragraphs summarize the air monitoring program.

H.2 AIR SAMPLING AND METEOROLOGICAL MONITORING

H.2.0.1. The air monitoring program used five "hi-vol" total suspended particulate (TSP) samplers. Two composite samples were collected from each of four sampling locations (one location employed two samplers) during the period from October 8 through December 7, 1993, for a total of eight samples. These samples were submitted to the analytical laboratory for TAL metals. Meteorological measurements were taken over the duration of the sampling program using a temporary meteorological tower, and these results were used in interpreting the results of the air sampling program, as discussed in USEPA (1989). The following section describes the air monitoring and meteorological data collection that was used at SWMU 42. A complete description of techniques used for TSP sampling and filter preparation and handling is included in the NAWC report.

H.2.0.2. Three of the sampling installations consisted of a TSP "high-vol" sampler mounted on a platform with an inlet height of about 3 meters above ground level. A fourth location had two of these samplers; the samples for the two were composited and treated as one. "Hi-vol" samplers capture particulates on a filter and can collect a 2,000 cubic meter air sample in 24 hours. The samplers ran on a standard EPA schedule (EPA 40 CFR Part 258, Appendix C) of one 24-hour sample every sixth day for a total period of two months. Four samples were collected from each sampler each month. A NAWC technician loaded a filter onto each sampler, set the timer to start the sampling at noon of the sampling day, and retrieved the filters after the collection was complete. The technician also "exposed" two blank filters to use as quality control samples in evaluating the representativeness of the air samples. NAWC calculated the total mass loadings and the resultant TSP concentrations for each filter including the blanks. Filters collected each month at each site were composited by digestion at DataChem Laboratory into a single metals sample per site per month. Samples were analyzed for TAL metals.

H.2.0.3. NAWC installed and operated a meteorological tower for the duration of the air quality sampling. Measurements were made continuously for wind speed, direction, and temperature; these data were reported as hourly averages for the entire monitoring period. The meteorological tower consisted of a guyed 5-meter tower, mounted on an anchored tower base. Data was continuously logged using a data logger and downloaded weekly to a laptop computer.

RESULTS OF TOTAL SUSPENDED PARTICULATE AND METEOROLOGICAL MONITORING CONDUCTED AT THE TOOELE ARMY DEPOT, NORTH AREA

NAWC Report AQ 94-5
Project No. 04142

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April, 1994

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RESULTS OF TOTAL SUSPENDED PARTICULATE AND METEOROLOGICAL MONITORING CONDUCTED AT THE TOOELE ARMY DEPOT, NORTH AREA

AQ Report AQ 94-5

Project No. 04142

1.0 INTRODUCTION

North American Weather Consultants (NAWC), a subsidiary of TRC Environmental Corporation, was retained by Montgomery Watson to conduct Total Suspended Particulate (TSP) and meteorological monitoring at Solid Waste Management Unit 42 (SWMU42) at the Tooele Army Depot, North Area (TEAD-N) for a two month period during the autumn of 1993. The objective of this sampling was to collect data that are used to support an evaluation of potential airborne contaminant transport and health risks due to elevated metals in surface soils in the area.

2.0 SITE DESCRIPTION

Tooele Army Depot North Area is located approximately 35 miles southwest of Salt Lake City, Utah. TEAD-N encompasses 24,732 acres in the Tooele Valley in Tooele County, Utah. TEAD-N is bounded to the south by the Stockton Bar and South Mountain, to the west by the Stansbury Mountains, to the east by the Oquirrh Mountains, and to the north by Grantsville and the Great Salt Lake.

Tooele, Utah is located in a semi-arid region with precipitation averaging approximately 16 inches a year. The wettest months are in the Spring (March and April). The Great Salt Lake located north of Tooele enhances precipitation during the winter months due to "lake effect". Lake effect occurs when cold air out of the north crosses a large portion of the lake. The moisture condenses on the lee or downwind side of the lake increasing precipitation.

The wind patterns at Tooele are influenced by north-south oriented mountain ranges to the east and west which causes a large percentage of the winds to be north and south. The prevailing winds during the early morning hours or prior to a frontal system are generally out of the south and southwest. In the afternoon, the prevailing wind is out of the north.

Average temperatures for the area range from 29°F in January to 75°F in August. Temperature extremes for the area have been recorded with summertime temperatures exceeding 100°F and wintertime temperatures falling below zero.

3.0 TOTAL SUSPENDED PARTICULATE MONITORING

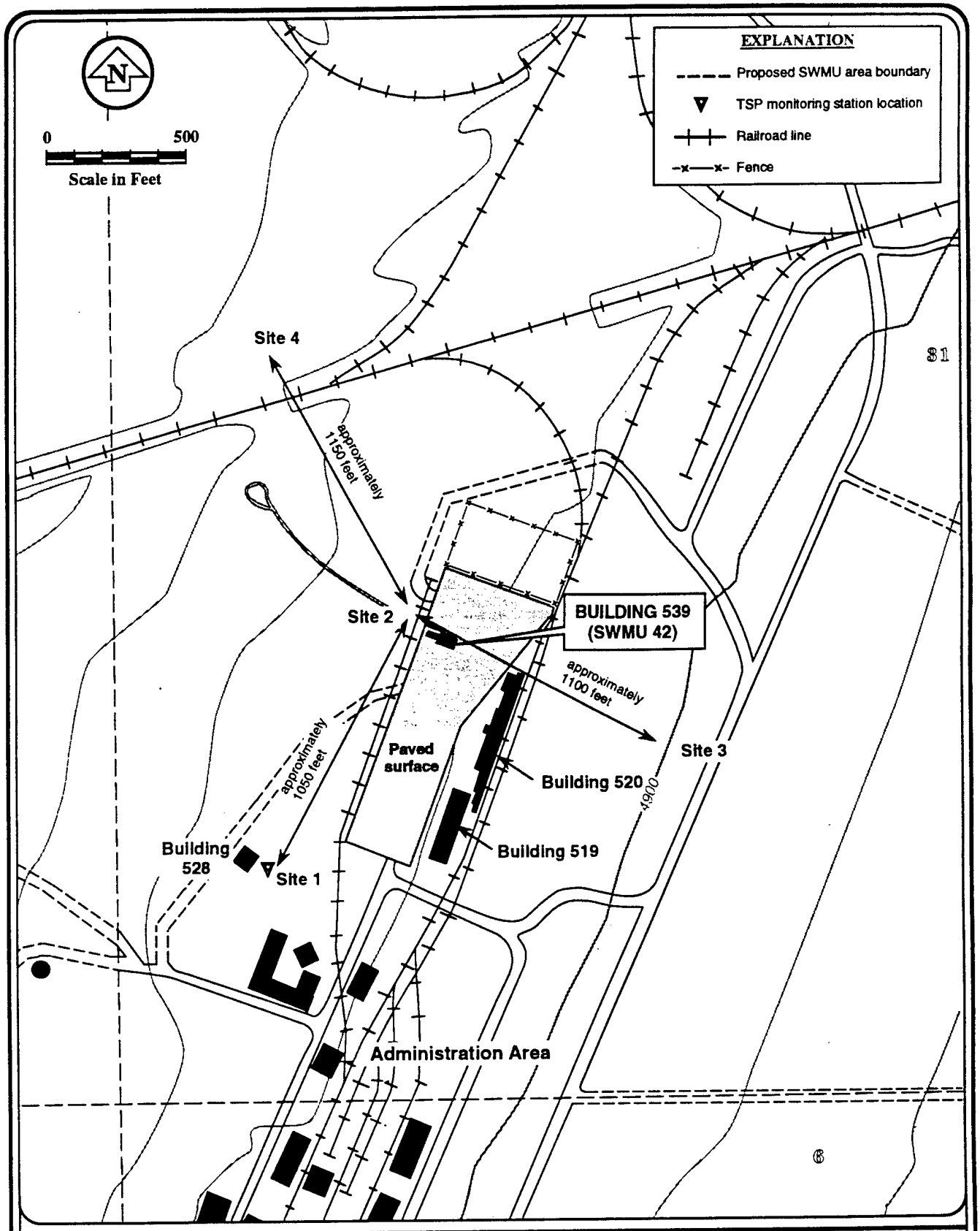
Total Suspended Particulate (TSP) monitoring was conducted from October 8, 1993, through December 6, 1993 at TEAD-N. TSP samples were collected at four sites for 24-hour periods every sixth day during each of two sampling months. The first month of sampling, referred to as Round 1 in this report, was conducted from October 8 through November 3, 1993. The second month of sampling, referred to as Round 2 was conducted from November 8 through December 6, 1993. From the TSP samples collected, TSP concentrations were determined for each sampling run; metal concentrations were determined per site, per month.

3.1 Air Quality Site Selection and Equipment Installation

During the last week of September, 1993, NAWC, accompanied by Montgomery Watson personnel visited the TEAD-N and selected sites for TSP monitoring. These sites were selected in accordance to EPA probe siting criteria as outlined in 40 CFR Part 58, Appendix E. TSP monitoring equipment was installed on October 5, 1993 at all sites. Figure 3.1 presents the locations of the monitoring sites.

3.2 TSP Sampling Procedures

TSP sampling was conducted in accordance with 40 CFR Part 50, Appendix B. The TSP samplers used for this study were manufactured by General Metal Works. Each sampler was equipped with an electronic flow controller, mechanical timer or an elapsed timer and a Dickson recorder. The flow controller was maintained at a flow rate between 39 and 60 cubic feet per minute (CFM) (1.1-1.7 m^3/min). A timer was used to start and stop the samplers. Samples were collected every sixth day for approximately 24-hours, from noon to noon instead of the normal midnight to midnight due to light and site access constraints.



Source: Modified from USGS Tooele 7.5 minute quadrangle.

TSP MONITORING EQUIPMENT LOCATIONS
FIGURE 3-1

North American Weather Consultants

Each TSP sampler was maintained and calibrated prior to deployment to the field. The maintenance performed included cleaning the motor housing, leak testing, cartridge pen replacement and/or inspection, replacement of motor gasket brushes, and replacement of malfunctioning parts. TSP sampler calibration procedures, and equipment and orifice calibrations are presented in Appendix A.

Each TSP sampler was mounted on a wooden platform to an inlet height of approximately three meters above ground level. ONAN generators, fueled by unleaded gasoline, were used to power the samplers. At each sampling site, the generator was placed at a sufficient distance (approximately 100 feet) away from the sampler so that the generator's exhaust would not affect the particulate air samples. The generators were partially enclosed in a wooden shelter to protect them from the weather and to deter theft. The generators were also grounded for safety purposes.

Site visits were performed bi-weekly by a NAWC field technician to service the samplers and generators, download meteorological data, remove exposed filters after sampling, and replace the sampler filters prior to the next sampling event.

3.3 Flow Check and Calibration Validation of TSP Samplers

On November 11, 1993, a validation of the TSP samplers flow rates was performed. The results of the flow checks indicated that the samplers were functioning properly and were found to be within EPA specified guidelines. A subsequent one-point flow check, performed prior and after each sampling run, indicated that the mass flow controller on sampler TSP-5, at Site #2, was malfunctioning and that the flow rate was out of the range specified by 40 CFR 50, Appendix B. The mass flow controller was replaced on sampler TSP-5 on November 24, 1993, and the flow was reset. The results of these flow checks and field QC flow-check procedures are presented in Appendix B.

3.4 TSP Sampler Audit

At the end of the sampling program, a performance audit of the TSP samplers was conducted. The performance audit consisted of the determination of the accuracy of the measurement systems by a person who was not involved with the sampling study. The performance audit was conducted in accordance with the specifications of the U.S. EPA, as described in the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II: Ambient Air Specific Methods, 1989. The results of the performance audit showed that all equipment was in good condition and that all equipment yielded acceptable tolerances that met manufacturers' and EPA approved quality assurance guidelines. Appendix C contains the TSP performance audit results.

3.5 Sample Handling and Custody Requirements

Gelman glass fiber hi-vol filters, with a collection efficiency of greater than or equal to 99 percent were used for this study. Each filter was prepared, tared and final weighed in accordance with 40 CFR 50 Appendix B. Appendix D of this report contains the NAWC filter laboratory standard operating procedures used in the selection, preparation, and weighing of glass fiber filters for high volume sampling, and in net mass and TSP concentration determination. Tare and final weight filter results are also included in Appendix D.

After the initial weighing, the tared filters were placed in a glassine insert placed in a manila folder. The manila folder was identified with the filter number. The filter and corresponding manila folder were inserted in a zip-closure plastic bag. The plastic bag was also identified with the same number as the filter and manila folder.

A sampling packet, consisting of a yellow envelope imprinted with a Data/Summary Calculation Sheet was generated by the NAWC filter laboratory. The contents of the sampling packet were as follows:

- zip closure bag containing manila folder and filter,
- chain-of-custody form,
- Data/Summary Calculation sheet, and
- Dickson chart.

The chain-of-custody (COC) form was initiated by the laboratory personnel after a filter's tare weight had been determined. The COC was relinquished when samples were needed by the field technician or when samples were sent to an analytical laboratory for metals analysis.

After final weights and TSP concentrations were determined, the filters were packaged and sent to DataChem Laboratories for metals analysis. Copies of the COC forms are presented in Appendix E.

3.6 TSP Sample Blanks

Blank filters were collected at each sampling site in the middle and at the end of the sampling program. To collect a blank, the filter was installed on the sampler and removed 24-hours later. No air was drawn through the filters used as blanks.

4.0 TSP CONCENTRATION RESULTS

Contained in Table 4-1 are the TSP concentration results for the sampling program. The data were corrected to EPA standard conditions (25°C and 760 mm Hg) using the mean temperature obtained from Site #3, where meteorological measurements were being collected, for the sampling period. The barometric pressure used was derived from the elevation of the site.

The results of the sampling showed that all TSP concentrations were below the 24-hour TSP National Ambient Air Quality Standard (NAAQS) which is 260 $\mu g/m^3$. The highest concentrations observed occurred during the sampling run of November 2nd through 3rd, where the concentration measured was at Site #2, at 145.3 $\mu g/m^3$.

Data recovery for all sites was 100 percent for each round of sampling except for Site #1 during Round 2. The sampler at Site #1 did not run on November 20, 1993, due to a generator malfunction. In addition, samples collected at Sites 1, 2, and 4 on October 15, 1993, ran short of the normal 24-hour sampling time. Each sample ran on average 14 hours or approximately 60 percent of the normal sampling time. No explanation was found to explain the short run time as all equipment was functioning properly when checked after the run. The sampler at Site #1 ran short (approximately 21 hours) of the normal 24-hour run time on November 27, 1993, due to a motor malfunction. The motor was replaced after the run. The sampler at Site #1 continued to run short for the next two sampling runs due to a faulty timer. Since the samplers mentioned previously ran short of the 24-hour normal sampling time, the TSP concentrations shown in Table 4-1 for these samplers may be less than if they ran for 24-hours. EPA guidance suggests that samples which run less than 23 or greater than 25 hours should be at a minimum flagged.

Appendix F contains the field Data Summary/Calculation for mass flow controlled (MFC) Samplers.

Table 4-1

TSP Sampling Information and Concentration Results for Sampling Conducted at the Tooele Army Depot

FILTER NUMBER	SAMPLE DATE	TARE WEIGHT	FINAL WEIGHT	NET WEIGHT	AVERAGE TEMP.	SITE PRESS.	Qstd (SCMM)	ELAPSED TIME	VOLUME (SCM)	TSP CONC.	SITE #	SAMPLER ID #
14201	10/08-09/93	3.6564	3.6685	0.0121	277.9	628.4	1.387	1452.8	2015.3	6.00	1	TSP-2
14202	10/08-09/93	3.6470	3.6604	0.0134	277.9	628.4	1.557	1432.0	2229.5	6.01	3	TSP-1
14204	10/08-09/93	3.6480	3.6616	0.0136	277.9	628.4	1.568	1445.9	2267.0	6.00	4	TSP-3
14205	10/08-09/93	3.6471	3.6594	0.0123	277.9	628.4	1.322	1448.7	1914.7	6.42	2	TSP-5
14207	10/15-16/93	3.6318	3.6423	0.0105	281.4	628.4	1.615	1420.0	2292.8	4.58	3	TSP-1
14208	10/15-16/93	3.6396	3.6471	0.0075	281.4	628.4	1.569	795.0	1247.7	6.01	4	TSP-3
14209	10/15-16/93	3.6449	3.6508	0.0059	281.4	628.4	1.314	826.6	1086.2	5.43	2	TSP-5
14210	10/15-16/93	3.6509	3.6586	0.0077	281.4	628.4	1.391	908.8	1263.8	6.09	1	TSP-2
14211	10/21-22/93	3.6489	3.6988	0.0499	282.0	628.4	1.613	1352.6	2181.8	22.87	3	TSP-1
14212	10/21-22/93	3.6559	3.7089	0.0530	282.0	628.4	1.536	1454.3	2233.4	23.73	4	TSP-3
14213	10/21-22/93	3.6554	3.6970	0.0416	282.0	628.4	1.307	1310.7	1712.7	24.29	2	TSP-5
14214	10/21-22/93	3.6623	3.7108	0.0485	282.0	628.4	1.383	1454.7	2012.1	24.10	1	TSP-2
14215	10/27-28/93	3.6618	3.8116	0.1498	280.5	628.4	1.381	1453.5	2006.9	74.64	1	TSP-2
14216	10/27-28/93	3.6575	3.7569	0.0994	280.5	628.4	1.298	1455.4	1888.5	52.63	2	TSP-5
14217	10/27-28/93	3.6559	3.7336	0.0777	280.5	628.4	1.518	1444.5	2192.3	35.44	4	TSP-3
14218	10/27-28/93	3.6497	3.7162	0.0665	280.5	628.4	1.630	1429.3	2330.0	28.54	3	TSP-1
14219	11/02-03/93	3.6533	3.8914	0.2381	276.7	628.4	1.384	1459.4	2019.8	117.88	1	TSP-2
14220	11/02-03/93	3.6459	3.9209	0.2750	276.7	628.4	1.300	1456.5	1892.8	145.29	2	TSP-5
14221	11/02-03/93	3.6490	3.8053	0.1563	276.7	628.4	1.671	1441.4	2408.7	64.89	3	TSP-1
14222	11/02-03/93	3.6553	3.8245	0.1692	276.7	628.4	1.527	1447.0	2210.0	76.56	4	TSP-3
14223	11/08-09/93	3.6553	3.7621	0.1068	276.7	628.4	1.408	1455.5	2049.8	52.10	1	TSP-2
14224	11/08-09/93	3.6546	3.7517	0.0971	276.7	628.4	1.300	1456.6	1892.9	51.30	2	TSP-5
14225	11/08-09/93	3.6553	3.7143	0.0590	276.7	628.4	1.682	1394.2	2344.8	25.16	3	TSP-1
14226	11/08-09/93	3.6545	3.7293	0.0748	2[illegible]	628.4	1.482	1461.5	2166.6	34.52	4	TSP-[illegible]

Table 4-1 (continued)

TSP Sampling Information and Concentration Results for Sampling Conducted at the Tooele Army Depot

FILTER NUMBER	SAMPLE DATE	TARE WEIGHT	FINAL WEIGHT	NET WEIGHT	AVERAGE TEMP.	SITE PRESS.	Qstd (SCMM)	ELAPSED TIME	VOLUME (SCM)	TSP CONC.	SITE #	SAMPLER ID #
14227	11/11-12/93	3.6611	3.6618	0.0007	278.5	628.4	0.000	1440.0	0.00	0.00	1	TSP-2
14228	11/11-12/93	3.6658	3.6666	0.0008	278.5	628.4	0.000	1440.0	0.00	0.00	2	TSP-5
14229	11/11-12/93	3.6587	3.6590	0.0003	278.5	628.4	0.000	1440.0	0.00	0.00	3	TSP-1
14230	11/11-12/93	3.6568	3.6560	-0.0008	278.5	628.4	0.000	1440.0	0.00	0.00	4	TSP-3
14231	11/14-15/93	3.6471	3.7154	0.0683	271.8	628.4	1.409	968.6	1364.4	50.06	1	TSP-2
14233	11/14-15/93	3.6548	3.7596	0.1048	271.8	628.4	1.348	1453.6	1958.95	53.50	2	TSP-5
14234	11/14-15/93	3.6555	3.7483	0.0928	271.8	628.4	1.641	1438.3	2360.70	39.31	3	TSP-1
14235	11/14-15/93	3.6620	3.7608	0.0988	271.8	628.4	1.553	1460.7	2269.02	43.54	4	TSP-3
14236	11/20-21/93	3.6459	3.7136	0.0677	272.0	628.4	1.359	1453.1	1975.41	34.27	2	TSP-5
14237	11/20-21/93	3.6512	3.7116	0.0604	272.0	628.4	1.618	1438.0	2327.20	25.95	3	TSP-1
14238	11/20-21/93	3.6456	3.7130	0.0674	272.0	628.4	1.597	1459.0	2329.40	28.93	4	TSP-3
14239	11/27-28/93	3.6497	3.6849	0.0352	267.6	628.4	1.440	1282.7	1847.70	19.05	1	TSP-2
14240	11/27-28/93	3.6550	3.7013	0.0463	267.6	628.4	1.361	1447.9	1970.71	23.49	2	TSP-5
14241	11/27-28/93	3.6547	3.6947	0.0400	267.6	628.4	1.489	1444.0	2149.69	18.61	3	TSP-1
14242	11/27-28/93	3.6326	3.6818	0.0492	267.6	628.4	1.565	1462.3	2287.96	21.50	4	TSP-3
14243	12/02-03/93	3.6562	3.6762	0.0200	270.3	628.4	1.410	730.2	1029.42	19.43	1	TSP-2
14244	12/02-03/93	3.6667	3.7120	0.0453	270.3	628.4	1.294	1458.3	1887.72	24.00	2	TSP-5
14245	12/02-03/93	3.6673	3.7029	0.0356	270.3	628.4	1.554	1447.1	2248.72	15.83	3	TSP-1
14246	12/02-03/93	3.6596	3.6810	0.0214	270.3	628.4	1.544	706.7	1091.13	19.61	4	TSP-3
14247	12/06-07/93	3.6526	3.6530	0.0004	271.9	628.4	0.000	1440.0	0.00	0.000	2	TSP-5
14248	12/06-07/93	3.6505	3.6500	-0.0005	271.9	628.4	0.000	1440.0	0.00	0.000	3	TSP-1
14249	12/06-07/93	3.6394	3.6394	0.0000	271.9	628.4	0.000	1440.0	0.00	0.000	4	TSP-3
14250	12/06-07/93	3.6520	3.6528	0.0008	271.9	628.4	0.000	1440.0	0.00	0.000	1	TSP-2

5.0 METALS ANALYSES

After the final weights for each filter had been determined and the TSP concentrations calculated, the filters, including blanks were sent to DataChem Laboratories for analysis of metals according to U.S. EPA SW-846 methods 6010 and 7471. The filters collected at each site were composited each month to result in a single metals analysis per site, per month. The composite metals concentrations found in the ambient air at Sites 1 through 4 for sampling rounds 1 and 2 are found in Tables 5-1 and 5-2, respectively. Appendix G contains the metals analyses results from DataChem Laboratories.

As can be seen from the results of sampling Round 1, most metals appeared in concentrations greater than the level of detection (LOD) with the exceptions of antimony, beryllium, nickel, silver, thallium, and vanadium. Mercury was only detected at Site 4. During sampling Round 2, on average, metals concentrations detected were slightly less than those found during Round 1. Cobalt and silver, which were not detected at any sites during Round 1, were found at Sites 1 through 3 and Sites 1 through 4, respectively, during Round 2. The LOD and blank concentrations were calculated using an average air volume of 10,000 cubic meters.

Table 5-1

Results of Composite Metals Analysis
Sampling Round 1
October 8 - November 3, 1993

Analyte	Site 1 ($\mu g/m^3$)	Site 2 ($\mu g/m^3$)	Site 3 ($\mu g/m^3$)	Site 4 ($\mu g/m^3$)	Blank ($\mu g/m^3$)	Level of Detection ($\mu g/m^3$)
Aluminum	1.40	1.50	1.10	1.30	0.53	0.005
Antimony	ND	ND	ND	ND	ND	0.005
Arsenic	0.012	0.018	0.015	0.018	0.0052	0.0003
Barium	1.90	1.40	1.30	1.60	0.25	0.0003
Beryllium	ND	ND	ND	ND	ND	0.0003
Cadmium	0.00035	0.00044	0.00030	0.00033	0.00013	0.00003
Chromium	0.0058	0.0079	0.0055	0.0065	0.0038	0.0008
Cobalt	ND	ND	ND	ND	ND	0.0006
Copper	0.17	0.21	0.13	0.15	0.042	0.0008
Iron	0.37	0.84	0.52	0.57	0.40	0.002
Lead	0.02	0.077	0.031	0.031	0.013	0.0001
Manganese	0.01	0.023	0.015	0.015	0.011	0.0004
Mercury	ND	ND	ND	0.00007	ND	0.00006
Nickel	ND	0.003	ND	ND	ND	0.003
Selenium	0.0036	0.0041	0.0035	0.0045	0.0007	0.0002
Silver	ND	0.0006	ND	ND	ND	0.0005
Thallium	ND	ND	ND	ND	ND	0.0004
Vanadium	ND	ND	ND	ND	ND	0.002
Zinc	1.60	1.20	1.10	1.40	0.27	0.0006

Table 5-2

Results of Composite Metals Analysis
Sampling Round 2
November 8 - December 7, 1993

Analyte	Site 1 ($\mu g/m^3$)	Site 2 ($\mu g/m^3$)	Site 3 ($\mu g/m^3$)	Site 4 ($\mu g/m^3$)	Blank ($\mu g/m^3$)	Level of Detection ($\mu g/m^3$)
Aluminum	0.60	0.48	0.42	0.43	0.15	0.005
Antimony	ND	ND	ND	ND	ND	0.005
Arsenic	0.012	0.026	0.019	0.028	0.00073	0.0003
Barium	0.31	0.18	0.28	0.16	0.0026	0.0003
Beryllium	ND	ND	ND	ND	ND	0.0003
Cadmium	0.00037	0.00044	0.00027	0.00038	0.00009	0.00003
Chromium	0.0058	0.0046	0.0034	0.0033	0.0020	0.0008
Cobalt	0.0010	0.00067	0.0012	ND	ND	0.0006
Copper	0.15	0.19	0.08	0.13	0.0035	0.0008
Iron	0.50	0.49	0.40	0.45	0.029	0.002
Lead	0.024	0.044	0.032	0.034	0.0014	0.0001
Manganese	0.013	0.014	0.012	0.012	0.00097	0.0004
Mercury	ND	ND	ND	ND	ND	0.00006
Nickel	ND	ND	ND	ND	ND	0.003
Selenium	0.0059	0.010	0.0074	0.011	0.00025	0.0002
Silver	0.0010	0.00088	0.00074	0.0009	ND	0.0005
Thallium	ND	ND	ND	ND	ND	0.0004
Vanadium	ND	ND	ND	ND	ND	0.002
Zinc	0.29	0.17	0.27	0.16	0.0049	0.0006

6.0 METEOROLOGICAL MONITORING

Meteorological monitoring was conducted continuously at Site #3 from October 8, 1993 through December 6, 1993. The meteorological monitoring site was selected in accordance with the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV: Meteorological Instruments.

The meteorological parameters measured continuously at Site #3 included wind speed, wind direction, sigma theta (standard deviation of the horizontal wind direction), and temperature. The meteorological equipment consisted of a R.M. Young Coastal Climate WeatherPak which was calibrated in the NAWC instrument laboratory prior to deployment to the field. The WeatherPak was aligned to true north. Appendix H contains the WeatherPak calibration data. The WeatherPak was mounted at three meters onto a steel mast. The mast was mounted to a base that was firmly anchored to the ground. The mast was also guyed for stability.

Data were collected by means of a Coastal Climate WeatherPak datalogger. Data were stored to the datalogger every five seconds. From the five-second data, five minute averages for each parameter were determined. From the five-minute averages, hourly averages were obtained and are presented in Appendix I.

6.1 Meteorological Monitoring Results

This section of the report summarizes the data results and the data recovery for the two month monitoring period.

6.1.1 Wind Speed and Horizontal Wind Direction

Figure 6.1 provides a diagram of the joint frequency distribution of occurrence (wind rose) of wind speed and wind direction. Wind data recovery was 99.5 percent for the two month monitoring period.

The most frequent (and predominant) winds were from the south, with the second most frequent being from the south-southwest. Winds from the west were almost non-existent. Reported wind directions represent the directions from which the wind is blowing.

Wind speed records show that 0.46 percent of the winds were calm. The majority of the lightest winds (1-3 m/s) were from the southeast. Stronger winds (4-6 m/s) are from the southwest.

6.1.2 Temperature

The mean, maximum, and minimum temperatures for each day of the two month monitoring period are presented in Table 6-1. The days in which TSP sampling was conducted are indicated in the comment column of the table. The mean, maximum, and minimum temperatures are based on 24 hourly averages.

The mean temperature during October 5 - October 31, 1993, at TEAD-N was 8.4°C (47°F). The mean temperature for the month of November and the first week of December are 0.3°C (32.5°F) and -0.66°C (30.8°F), respectively. Temperature data recovery was 99.5 percent for the monitoring period.

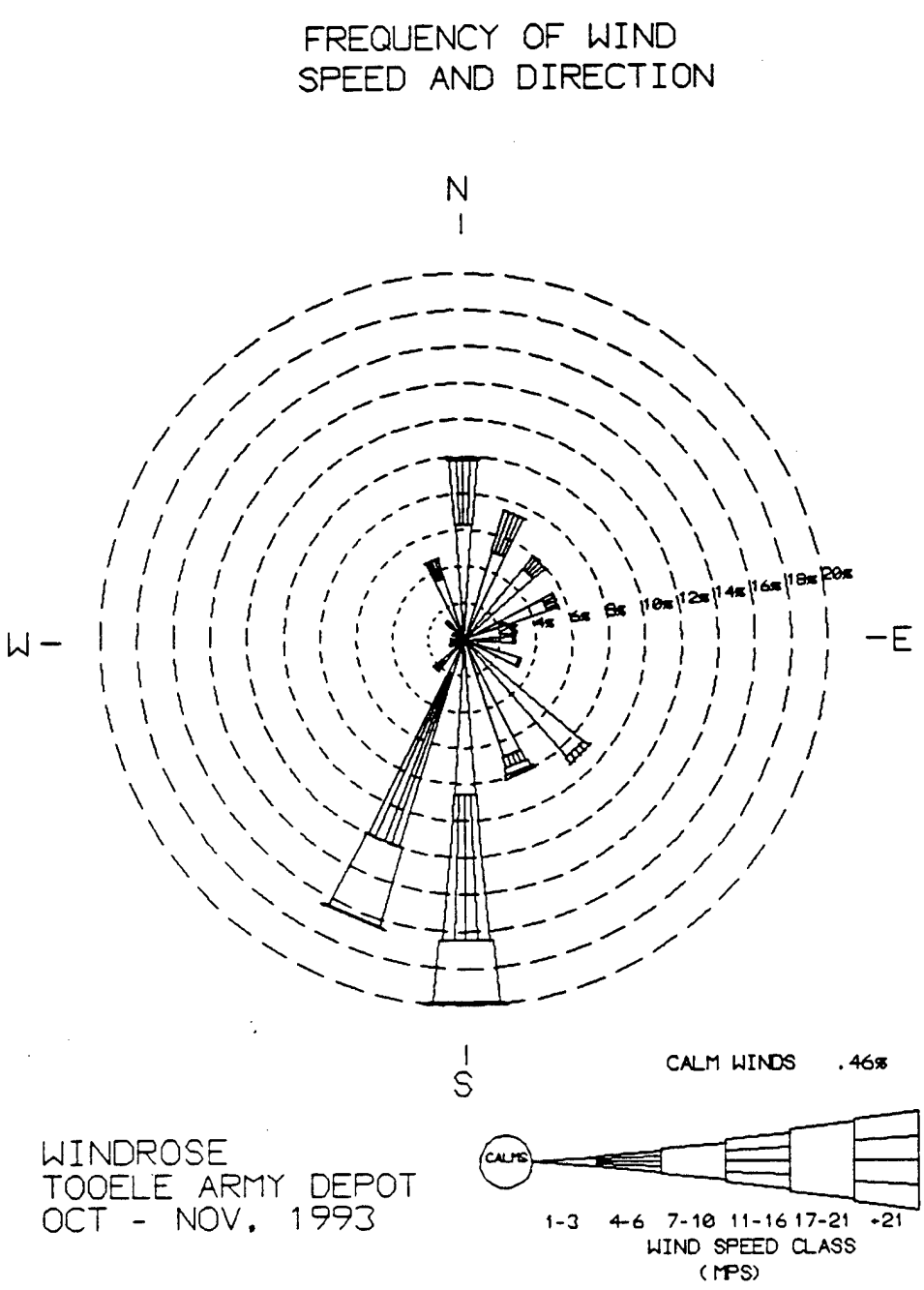


Figure 6.1 Frequency Distribution of Wind Speed and Direction from October 8 - December 6, 1993

Table 6-1

Temperature and Precipitation Data for Monitoring Period

Year, Month, Day	Mean Temp. (°C)	Max. Temp. (°C)	Min. Temp. (°C)	Precip. (in)	COMMENTS
931005	20.8	27.1	14.3		
931006	15.1	18.1	12.5	0.19	
931007	10.5	14.2	4.9	1.53	
931008	5.4	9.2	2.4	0.02	Sample 10/08 - 10/09
931009	5.4	11.3	1.9		
931010	8.3	16.3	0.9		
931011	11	16.4	6.1	1.13	
931012	10.7	14	7.8	0.08	
931013	9.5	13.7	5.9	0.15	
931014	10.2	14.6	6.7	0.23	
931015	8.9	11.6	6.9	0.13	Sample 10/15 - 10/16
931016	8.1	10.8	5.8	0.23	
931017	6.7	8.7	5.5		
931018	7.7	11.4	5.2		
931019	7	12.8	2.1		
931020	7.2	12.3	2.8		
931021	7	13	1.8		Sample 10/21 - 10/22
931022	9.8	15.4	5.7		
931023	9.3	16.5	3		
931024	10.1	16.6	4.5		
931025	8.9	13.7	4.9		
931026	5.7	10	2.5		

Table 6-1
(continued)

Temperature and Precipitation Data for Monitoring Period

Year, Month, Day	Mean Temp. (°C)	Max. Temp. (°C)	Min. Temp. (°C)	Precip. (in)	COMMENTS
931027	6.3	13.2	0.1		Sample 10/27 - 10/28
931028	7.5	13.6	4.3		
931029	3.8	6.8	0.1		
931030	1.6	9.8	-3.9		
931031	4.1	11.7	-1.7		
931101	4.8	7.2	1.9		
931102	1.6	8.6	-2.4		Sample 11/02 - 11/03
931103	6.5	13.6	0		
931104	4.9	12.3	-0.1		
931105	1	4	-2.2		
931106	-0.4	7.6	-5.9		
931107	1.4	8.1	-4.8		
931108	2.2	9.9	-3		Sample 11/08-11/09
931109	3.6	9.4	-3.4		
931110	5.9	8.2	2.7		
931111	4.8	6.2	2.4		Blank Sample 11/11 - 11/12
931112	4.2	6.1	1.1		
931113	1.9	4.8	-0.9		
931114	0.9	4.6	-1.7		Sample 11/14 - 11/15
931115	-1	5.1	-6.9		
931116	1.1	8.9	-2.9		
931117	4	11.2	-0.8		

Table 6-1
(continued)

Temperature and Precipitation Data for Monitoring Period

Year, Month, Day	Mean Temp. (°C)	Max. Temp. (°C)	Min. Temp. (°C)	Precip. (in)	COMMENTS
931118	3.5	6.2	-3.3	0.01	
931119	-3.2	1.9	-7		
931120	-3.5	3.6	-8.1		Sample 11/20 - 11/21
931121	0.8	9	-4.3		
931122	7.4	11.4	4.6	0.24	
931123	-2.5	-0.3	-5.5	0.08	
931124	-6.2	-2	-10	0.17	
931125	-10.4	-4.2	-15.6		
931126	-11.1	-3.9	-17		
931127	-7.9	0.2	-13.2		Sample 11/27 - 11/28
931128	-4.5	-0.6	-8.1		
931129	-0.5	6	-5.5		
931130	0.7	4.2	-2.5		
931201	-0.7	5.3	-5		
931202	0.8	3.7	-3.3	0.02	Sample 12/02 - 12/03
931203	-2.1	4.9	-7.5		
931204	1.5	6.6	-1.4		
931205	-1.9	0.9	-5.1		
931206	0	7.1	-3.2		Blank Sample 12/06 - 12/07
931207	-2.2	3.6	-4.8		

6.1.3 Precipitation

Precipitation data were not collected at the TEAD-N during the monitoring period. Temperature data were obtained from the National Weather Service for Salt Lake City and are presented in Table 6-1. While the actual precipitation amounts probably differ at TEAD-N then those collected at Salt Lake City, the precipitation amounts give a general indication of weather conditions in the region.

In general, the majority of precipitation fell during or prior to the first two sampling periods (October 8 and 15, 1993). A slight amount of precipitation might have fallen during the December 2, 1993, sampling run. If precipitation fell during these runs, TSP concentrations may be less than if the TSP sampling was conducted on a dry day.

6.2 Meteorological Equipment Audit

At the end of the sampling program, a performance audit was conducted on the meteorological sensors. The performance audit consisted of the determination of the accuracy of the measurement systems by a person who was not involved with the sampling study. The performance audit was conducted in accordance with the specification of the U.S EPA, as described in the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV: Meteorological Measurements. The results of the performance audit showed that all equipment was in good condition and that all equipment yielded acceptable tolerances that met manufacturers' and EPA-approved quality assurance guidelines. Appendix J contains the meteorological sensor performance audit results.

APPENDIX A

TSP Sampler Calibration Procedures and
TSP and Orifice Calibration Data

BASIC CALIBRATION PROCEDURE FOR A MASS-FLOW-CONTROLLED (MFC) SAMPLER USING AN ORIFICE TRANSFER STANDARD

The MFC sampler calibration procedure presented in this subsection relates known flow rates to the pressure in the exit orifice plenum. The known flow rates are determined by an orifice transfer standard that has been certified according to the procedure presented in 40 CFR 50, Appendix B. The exit orifice plenum is the area within the motor housing (below the motor unit) that contains the air flow just before it is exhausted to the atmosphere through the exit orifice. It is recommended that this exit orifice plenum pressure be measured with a 25-cm (10-in.) water or oil manometer. It is further recommended that each sampler should have its own dedicated manometer, which can be conveniently mounted to the side of the sampler housing. Other types of pressure measurement devices may be used provided they have comparable accuracy. However, the 4-in. continuous pressure (flow) recorders of the type often supplied with HV TSP samplers are generally not sufficiently accurate and are not recommended for quantitative sampler pressure or flow measurements. These flow recorders should be used only for nonquantitative determination that the flow was approximately constant and uninterrupted over the sample period. The flow recorder may be connected in parallel with the manometer or other pressure measuring device, using a tee or "Y" tubing connection.

For this MFC calibration procedure, the following conditions are assumed:

- The HV TSP sampler is equipped with a mass flow controller to control its sample flow rate.
- The sampler flow rate is measured by measuring the exit orifice plenum pressure, using a water or oil manometer.
- The sampler is designed to operate at an actual volumetric flow rate of 1.1 to 1.7 m^3/min. (39-60 $ft.^3$/min.).
- The transfer standard for the flow-rate calibration is an orifice device equipped with either a series of resistance plates or an integral variable-resistance valve. The pressure drop across the orifice is measured by an associated water or oil manometer.
- The sampler will be calibrated in actual volumetric flow-rate units (Qa), and the orifice transfer standard is also calibrated in Qa.

Calibration Equipment

1. Orifice transfer standard with calibration traceable to NIST.

2. An associated water or oil manometer, with a 0 to 400 mm (0 to 16 in.) range and a minimum scale division of 1 mm (0.1 in.).

3. A water or oil manometer, with a 0 to 200 mm (0 to 8 in.) range and a minimum scale division of 1 mm (0.1 in.) for measurement of the sampler exit orifice plenum pressure. This manometer should be associated with the sampler.

   Note: Manometers used for field calibration may be subject to damage or malfunction and should thus be checked frequently.

4. Thermometer, capable of accurately measuring temperature over the range of 0 to 50°C (273 to 323 K) to the nearest ±1°C at least annually.

5. A portable aneroid barometer (e.g., a climber's or engineer's altimeter) capable of accurately measuring ambient barometric pressure over the range of 500 to 800 mm Hg (66 to 106 kPa) to the nearest mm Hg and referenced within ±5 mm Hg of a barometer of known accuracy at least annually.

6. Miscellaneous hand tools, calibration data sheets or station log book, and 51-mm (2-in.) duct tape.

Multi-point Flow-Rate Calibration Procedure - MFC Sampler

Caution: Do not attempt to calibrate the MFC sampler under windy conditions. Short-term wind velocity fluctuations will produce variable pressure readings by the orifice transfer standard's manometer. The calibration will be less precise because of the pressure variations.

1. Set up the calibration system as recommended by the manufacturer. MFC samplers are calibrated without a filter or filter cassette installed.

2. Disconnect the motor from the flow controller and plug it directly into a stable line voltage source (i.e., the sampler's on-off timer, if so equipped, or other source of the line voltage).

3. Install the orifice transfer standard and its adapter faceplate on the sampler. Check all gaskets and replace any questionable ones.

Caution: Tighten the faceplate nuts evenly on alternate corners to properly align and seat the gaskets. The nuts should be only hand-tightened because too much compression can damage the sealing gasket.

4. Select the first calibration flow rate and install the appropriate resistance plate or adjust the variable orifice valve. At least four flow rates are required to define the calibration relationship.

   At least three flow rates should be within (or nearly within) the acceptable flow rate range (1.1 to 1.7 m^3/min (39-60 ft^3/min.) for the sampler inlet. For resistance plate orifices, make sure that the orifice and resistance plate gaskets are in place and the orifice is not cross-threaded on the faceplate.

5. Leak Test: Block the orifice with a large diameter rubber stopper, wide duct tape, or other suitable means. Seal the pressure port with a rubber cap or similar device. Turn on the sampler.

   Caution: Avoid running the sampler for longer than 30 seconds at a time with the orifice blocked. This precaution will reduce the chance that the motor will be overheated due to the lack of cooling air. Such overheating can shorten the motor's lifetime. It can raise temperatures to the point of defeating the electrical insulation, which could result in fire or electric shock to the user.

   Gently rock the orifice transfer standard and listen for a whistling sound that would indicate a leak in the system. A leak-free system will not produce an upscale response in the sampler's exit orifice manometer or flow recorder. Leaks are usually caused either by a damaged or missing gasket between the orifice transfer standard and the faceplate or by cross-threading of the orifice transfer standard on the faceplate. All leaks must be eliminated before proceeding with the calibration. When the system is determined to be leak-free, turn off the sampler and unblock the orifice.

6. Inspect the connecting tubing of both manometers for crimps or cracks. Open the manometer valves (if present) and blow gently through the tubing, watching for the free flow of the fluid.

   Adjust the manometer's sliding scales so that their zero lines are at the bottom of the meniscuses. Connect the orifice transfer standard manometer to the orifice transfer standard. Connect the sampler's exit orifice manometer [and the continuous-flow recorder, if used] to the exit orifice plenum port. Ensure that

one side of each manometer is open to atmospheric pressure. Make sure that the tubing fits snugly on the pressure ports and on the manometer.

7. Read and record the following parameters on the HV TSP data sheet.

- date, location, and operator's signature,
- sampler S/N and model,
- ambient barometric pressure (Pa), mm Hg or kPa,
- ambient temperature (Ta), K (K = °C + 273), and
- orifice S/N and calibration relationship.

Note: Consistency of temperature and barometric pressure units is required. It is recommended that all temperatures be expressed in kelvin (K = °C + 273). It is also recommended that all barometric pressures be expressed in either mm Hg or kPa (but don't mix the two units). Take care to avoid calibrating a sampler using one set of units and then performing sample calculations using another set of units.

8. Turn on the sampler and allow it to warm up to operating temperature (3 to 5 min). Then, read and record the orifice transfer standard's manometer deflection, $\blacktriangle H_2O$ (in. H_2O), and the corresponding sampler's manometer deflection, ▲Pex.

Note: The sampler inlet may be partially lowered over the orifice transfer standard to act as a draft shield (if a shield is not otherwise provided). Use a block to provide at least 2 in. of clearance at the bottom for air flow and for the manometer tubing.

9. Install the other resistance plates or adjust the variable orifice value to obtain each of the other calibration flow rates and repeat Step 8 for each.

10. Plot the calibration data on a sheet of graph paper as specified in Step 4 of the next subsection.

Note: The data should be plotted in the field as the calibration is occurring, rather than afterwards back at the laboratory.

Repeat Step 8 for any data that are questionable on the plot. Running additional calibration points at differing flow rates or repeating the calibration points at the same flow rates is encouraged to improve the precision of the calibration.

11. Turn off the sampler and remove the orifice transfer standard.

12. Reconnect the sampler motor to the flow controller.

13. Perform the calibration calculations presented in the following subsection. The data generated will be used to set the mass flow controller to a value that will result in optimal volumetric flow based on the seasonal average temperature and barometric pressure at the monitoring site.

Calibration Calculations

Gather together all the calibration data, including the orifice calibration information and the sampler calibration data sheet.

Note: These calculations should be done at the time of the calibration, rather than later. This approach will allow additional calibration points to be taken if questions arise about the data that have already been obtained.

1. Verify that the orifice transfer standard calibration relationship is current and traceable to an acceptable primary standard.

2. Calculate and record Qa for each calibration point from the orifice calibration information and the following equation.

$$Qa(orifice) = \{[\blacktriangle H_2O(Ta/Pa)]^{1/2} - b\} \{1/m\}$$

where:

Qa(orifice)	=	actual volumetric flow rate as indicated by the transfer standard orifice, m^3/min
$\blacktriangle H_2O$	=	pressure drop across the orifice, in. H_2O
Ta	=	ambient temperature during use, K (K = °C + 273)
Pa	=	ambient barometric pressure during use, mm Hg (or kPa)
b	=	intercept of the orifice calibration relationship
m	=	slope of the orifice calibration relationship.

3. Calculate and record the quantity ▲Pext for each calibration point as:

$$\blacktriangle Pext = [\blacktriangle Pex(Ta/Pa)]^{1/2}$$

where:

▲Pext	=	transformed manometer reading
▲Pex	=	sampler manometer reading, inc. H_2O
Ta	=	ambient temperature, K (K = °C + 273)
Pa	=	ambient barometric pressure, mm Hg (or kPa).

4. On a sheet of graph paper, plot the calculated Qa(orifice) flow rates on the x-axis vs. the transformed sampler manometer response, ▲Pext [or the transformed flow recorder reading, It] on the y-axis.

Because the determination of the sampler's average operational flow rate (Qa) during a sample period depends on the ambient average temperature and pressure, use of a graphic plot of the calibration relationship is not recommended for subsequent data reduction. This plot is used only to visually assess the calibration points to see if any should be rerun.

Plot the regression line on the same graph paper as the calibration data. For the regression model $y = mx + b$, let $y = \blacktriangle Pext$ and $x = Qa(orifice)$ so that the model is given by:

$$\blacktriangle Pext = m[Qa)orifice)] + b$$

Using a programmable calculator or a calculation data form, determine the linear regression slope (m), intercept (b), and correlation coefficient (r) and record them on the data sheet. A five-point calibration should yield a regression equation with a correlation coefficient of $r > 0.990$, with no point deviating more than ± 0.04 m^3/min from the value predicted by the regression equation.

5. For subsequent sample periods, the sampler's average actual operational flow rate, Qa, is calculated from the calibration slope and intercept using the following equation:

$$\overline{Qa} = \{[\overline{\blacktriangle Pex(Tav/Pav)}]^{1/2} - b\} \{1/m\}$$

where:

Qa	=	the sampler's average actual flow rate, m^3/min
▲Pex	=	average of initial and final sampler manometer readings, $(\blacktriangle Pex_i + \blacktriangle Pex_f)/2$, in. H_2O
Tav	=	average ambient temperature for the sample period, K (K = °C + 273)
Pav	=	average ambient pressure for the sample period, mm Hg (or kPa)
b	=	intercept of the sampler calibration relationship
m	=	slope of the sampler calibration relationship.

Mass Flow Controller Adjustment Procedure

Because the controlled flow rate of an MFC sampler is adjustable, it must be set to the proper flow rate for the inlet. The constant mass flow maintained by the MFC causes the actual volumetric flow rate through the inlet to fluctuate as the ambient temperature and barometric pressure change at the monitoring site. Normally, the range of these fluctuations is within the allowable tolerance limits for the inlet to maintain the desired flowrate. However, the flow rate set point of the mass flow controller must be correctly adjusted so that the deviations are "centered" with respect to the seasonal average temperature and barometric pressure at the site, not the temperature and pressure prevailing at the time of setting.

Set the mass flow controller as follows:

1. Determine the seasonal average temperature (Ts) and seasonal average pressure (Ps) at the site and record them on the calibration data sheet. (Determination of the number of "seasons," i.e., the number of different seasonal average temperatures needed for the year, is left to the discretion of the local agency.)

2. Calculate SFR and record on the calibration data sheet:

$$SFR = (1.13)\ (Ps/Pa)\ (Ta/Ts)$$

where:

SFR = set-point actual volumetric flow rate for adjustment of the mass flow controller, based on seasonal average temperature and average pressure at site, m^3/min

1.13 = desired flow rate near low end of range, m^3/min

Ps, Pa = seasonal average and current ambient barometric pressure at the site, respectively, mm Hg (or kPa)

Ts, Ta = seasonal average and current ambient temperature, respectively, K (K = °C+273)

3. Calculate and record on the sampler's calibration data sheet the sampler set-point manometer reading that corresponds to the SFR calculated in Step 2.

$$SSP = [Pa/Ta][m(SFR) + b]^2$$

where:

SSP = sampler set-point manometer reading, in H_2O

Pa = ambient barometric pressure, mm Hg (or kPa)

Ta = ambient temperature, K (K = °C + 273)

m = slope of the sampler's calibration relationship

SFR = set-point flow rate from Step 2, m^3/min

b = intercept of the sampler's calibration relationship

4. Visually check to make sure the motor is connected to the mass flow controller and the manometer is properly connected.

5. Install a clean filter (in a filter cassette) in the sampler according to the manufacturer's instructions.

6. Turn on the sampler and allow it to warm up to operating temperature (3 to 5 min).

7. Following the manufacturer's instructions, adjust the mass flow controller until the manometer reading indicates the sampler set point (SSP) as calculated in Step 3.

8. Verify that the flow controller will maintain this flow rate for at least 10 min. Turn off the sampler.

9. The sampler can now be prepared for the next sample run day.

58 Gutman Street
Waltham, MA 02154
Tel. (617) 891-9380

High Volume Orifice Calibration Certificate

Pa: 773.4 mm of Hg
Ta: 19.0 °C
RH: 54 %

Roots Meter Serial No.: 7509364
Calibrator Orifice Model No.: 25A
Calibrator Orifice Serial No.: 8100587

Calibration Performed by: J.Lazaro
Calibration Date: 03MAY93
Date placed in service: _____

Q Standard Calibration Data

(1) Run Point No.	(2) Elapsed Time-Δt Min.	(3) Initial Volume VM M^3	(4) Meter Inlet Static Pressure-ΔP mm of Hg	(5) Standard Volume Vstd M^3	(6) Calibrator Orifice Static Pressure-ΔH in. of H_2O	(6) Calibrator Orifice Static Pressure-ΔH mm of Hg	(7) X Metric Flow Rate Qstd M^3/min.	(8) English Flow Rate Qstd ft^3/min.	(9) Y $\sqrt{\Delta H \left[\frac{Pa}{760}\right]\left[\frac{298.18}{Ta}\right]}$
1	1.430	1	3.0	1.034	2.0	3.74	0.723	25.5	1.441
2	1.009	1	6.3	1.030	4.0	7.47	1.021	36.0	2.038
3	0.903	1	7.9	1.028	5.0	9.34	1.138	40.2	2.279
4	0.860	1	8.7	1.027	5.5	10.27	1.104	42.2	2.390
5	0.711	1	12.8	1.021	8.0	14.94	1.436	50.7	2.882

Slope(m): 2.02 Intercept(b): -0.022865 Correlation Coefficient(r): 0.999994

Q Actual Calibration Data

(1) Run Point No.	(2) Elapsed Time-Δt Min.	(3) Initial Volume VM M^3	(4) Meter Inlet Static Pressure-ΔP mm of Hg	(5a) Actual Volume Va M^3	(6) Calibrator Orifice Static Pressure-ΔH in. of H_2O	(6) Calibrator Orifice Static Pressure-ΔH mm of Hg	(7a) X Metric Flow Rate Qa M^3/min.	(9a) Y $\sqrt{\Delta H \left[\frac{Ta}{Pa}\right]}$
1	1.430	1	3.0	0.996	2.0	3.74	0.697	0.869
2	1.009	1	6.3	0.992	4.0	7.47	0.983	1.229
3	0.903	1	7.9	0.990	5.0	9.34	1.096	1.374
4	0.860	1	8.7	0.989	5.5	10.27	1.149	1.441
5	0.711	1	12.8	0.983	8.0	14.94	1.383	1.738

Slope(m): 1.27 Intercept(b): -0.014226 Correlation Coefficient(r): 0.999994

Equations:

$$Vstd(5) = Vm(3)\ \frac{(Pa-\Delta P)\ Tstd}{Pstd \times Ta} \qquad Qstd = \frac{Vstd}{\Delta t}$$

$$Va(5a) = Vm(3)\ \frac{(Pa-\Delta P)}{Pstd} \qquad Qa = \frac{Vstd}{\Delta t}$$

Standard Conditions:

Tstd= 25°C= 298.18°K
Pstd= 760mm of Hg

For additional information consult:

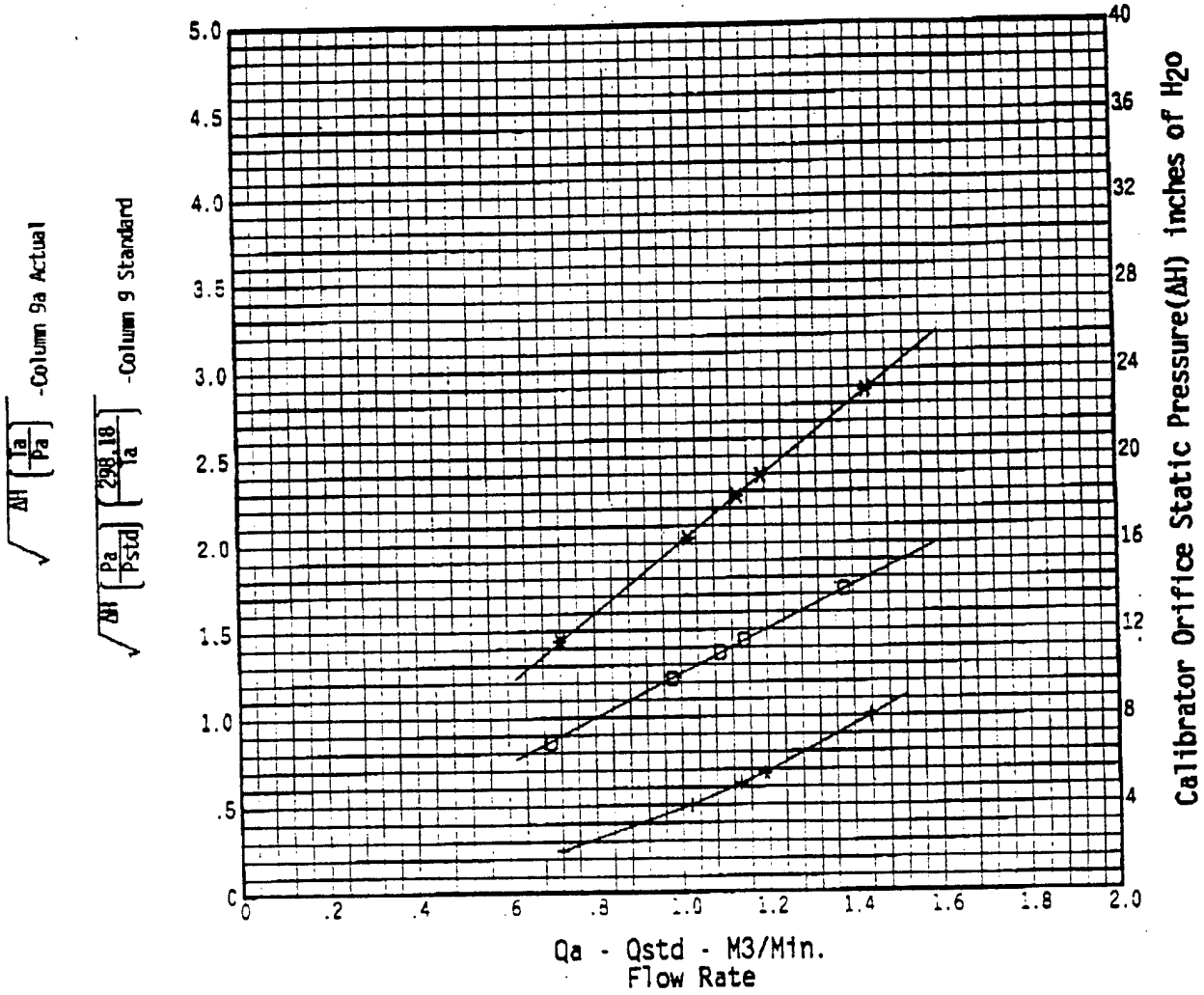
1. The Federal Register, Vol.47, No. 234, pp. 54896-54921, December 6, 1982.
2. Quality Assurance Handbook, Vol.II (EPA 600/4-77-277a), Section 2.11.
3. Graseby/GMW/Andersen Instruction Manual.

Notes:

1. EPA recommends calibrators should be recalibrated after one year of field use.

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Plot of Linear Regression Qstd/Qa and Traditional Qstd - ΔP
(Note ΔH is inches of H_2O)



(7) vs (9) * = Qstd
(7a) vs (9a) o = Qa
(7) vs (6) + = Qstd vs ΔH

Use of curve for determining Qa or Qstd.

To find Qa calculate:

$$Qa = \left[\frac{\Delta H\, Ta}{Pa}\right]^{\frac{1}{2}}$$

To find Qsto calculate:

$$Qstd = \left[\Delta H \frac{Pa}{760} \cdot \frac{298.18}{Ta}\right]^{\frac{1}{2}}$$

Where:

ΔH= Calibrator Manometer Reading in inches of water.
Ta= Actual Absolute Temperature in degress Kelvin(°K).
Pa= Actual Barometric Pressure in millimeters(mm) of Mercury(Hg).

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50 Gunnar Street
Waltham, MA 02154
Tel. (617) 891-9380

High Volume Orifice Calibration Certificate

Pa: 767.1 mm of Hg
Ta: 20.0 °C
RH: 52 %

Roots Meter Serial No.: 7509364
Calibrator Orifice Model No.: VRC
Calibrator Orifice Serial No.: 8102784

Calibration Performed by: J.Lazaro
Calibration Date: 16NOV93
Date placed in service:_____

Q Standard Calibration Data

(1) Run Point No.	(2) Elapsed Time-Δt Min.	(3) Initial Volume VM M^3	(4) Meter Inlet Static Pressure-ΔP mm of Hg	(5) Standard Volume Vstd M^3	(6) Calibrator Orifice Static Pressure-ΔH Y in. of H_2O	(6) Calibrator Orifice Static Pressure-ΔH mm of Hg	(7) X Metric Flow Rate Qstd M^3/min.	(8) English Flow Rate Qstd ft^3/min.	(9) Y $\sqrt{\Delta H \left[\frac{Pa}{760}\right]\left[\frac{298.18}{Ta}\right]}$
1	1.337	1	4.0	1.021	1.5	2.80	0.764	27.0	1.241
2	0.957	1	8.1	1.016	3.0	5.60	1.061	37.5	1.755
3	0.884	1	9.6	1.014	3.5	6.54	1.147	40.5	1.895
4	0.827	1	11.0	1.012	4.0	7.47	1.223	43.2	2.026
5	0.670	1	16.6	1.004	6.0	11.21	1.499	52.9	2.482

Slope(m): 1.69 Intercept(b): -0.042167 Correlation Coefficient(r): 0.999923

Q Actual Calibration Data

(1) Run Point No.	(2) Elapsed Time-Δt Min.	(3) Initial Volume VM M^3	(4) Meter Inlet Static Pressure-ΔP mm of Hg	(5a) Actual Volume Va M^3	(6) Calibrator Orifice Static Pressure-ΔH in. of H_2O	(6) Calibrator Orifice Static Pressure-ΔH mm of Hg	(7a) X Metric Flow Rate Qa M^3/min.	(9a) Y $\sqrt{\Delta H \left[\frac{Ta}{Pa}\right]}$
1	1.337	1	4.0	0.995	1.5	2.80	0.744	0.757
2	0.957	1	8.1	0.989	3.0	5.60	1.034	1.071
3	0.884	1	9.6	0.987	3.5	6.54	1.117	1.157
4	0.827	1	11.0	0.986	4.0	7.47	1.192	1.236
5	0.670	1	16.6	0.978	6.0	11.21	1.460	1.514

Slope(m): 1.06 Intercept(b): -0.026006 Correlation Coefficient(r): 0.999924

Equations:

$$Vstd(5) = Vm(3)\ \frac{(Pa-\Delta P)\ Tstd}{Pstd \times Ta} \qquad Qstd = \frac{Vstd}{\Delta t}$$

$$Va(5a) = Vm(3)\ \frac{(Pa-\Delta P)}{Pstd} \qquad Qa = \frac{Vstd}{\Delta t}$$

Standard Conditions:

Tstd= 25°C= 298.18°K
Pstd= 760mm of Hg

For additional information consult:

1. The Federal Register, Vol.47, No. 234, pp 54896-54921, December 6, 1982.
2. Quality Assurance Handbook, Vol.II (EPA 600/4-77-27a), Section 2.11.
3. Graseby/GMW/Andersen Instruction Manual.

Notes:

1. EPA recommends calibrators should be recalibrated after one year of field use.

Tel. (617) 891-9380

High Volume Orifice Calibration Certificate

Pa: 767.1 mm of Hg
Ta: 20.0 °C
RH: 52 %

Roots Meter Serial No.: 7509364
Calibrator Orifice Model No.: 25A
Calibrator Orifice Serial No.: 8022682

Calibration Performed by: J.Lazaro
Calibration Date: 16NOV93
Date placed in service:_____

Q Standard Calibration Data

(1) Run Point No.	(2) Elapsed Time-Δt Min.	(3) Initial Volume VM M^3	(4) Meter Inlet Static Pressure-ΔP mm of Hg	(5) Standard Volume Vstd M^3	(6) Calibrator Orifice Static Pressure-ΔH Y in. of H_2O	(6) Calibrator Orifice Static Pressure-ΔH mm of Hg	(7) X Metric Flow Rate Qstd M^3/min.	(8) English Flow Rate Qstd ft^3/min.	(9) Y $\sqrt{\Delta H \left[\frac{Pa}{760}\right] \left[\frac{298.18}{Ta}\right]}$
1	1.393	1	3.0	1.022	2.0	3.74	0.734	25.9	1.433
2	0.984	1	6.4	1.018	4.0	7.47	1.034	36.5	2.026
3	0.880	1	8.0	1.016	5.0	9.34	1.154	40.8	2.266
4	0.839	1	8.8	1.015	5.5	10.27	1.209	42.7	2.376
5	0.694	1	12.9	1.009	8.0	14.94	1.454	51.3	2.866

Slope(m): 1.99 Intercept(b): -0.029471 Correlation Coefficient(r): 0.999993

Q Actual Calibration Data

(1) Run Point No.	(2) Elapsed Time-Δt Min.	(3) Initial Volume VM M^3	(4) Meter Inlet Static Pressure-ΔP mm of Hg	(5a) Actual Volume Va M^3	(6) Calibrator Orifice Static Pressure-ΔH in. of H_2O	(6) Calibrator Orifice Static Pressure-ΔH mm of Hg	(7a) X Metric Flow Rate Qa M^3/min.	(9a) Y $\sqrt{\Delta H \left[\frac{Ta}{Pa}\right]}$
1	1.393	1	3.0	0.996	2.0	3.74	0.715	0.874
2	0.984	1	6.4	0.992	4.0	7.47	1.008	1.236
3	0.880	1	8.0	0.989	5.0	9.34	1.124	1.382
4	0.839	1	8.8	0.988	5.5	10.27	1.178	1.450
5	0.694	1	12.9	0.983	8.0	14.94	1.416	1.749

Slope(m): 1.25 Intercept(b): -0.018219 Correlation Coefficient(r): 0.999993

Equations:

$$Vstd(5) = Vm(3) \frac{(Pa-\Delta P)\ Tstd}{Pstd \times Ta} \qquad Qstd = \frac{Vstd}{\Delta t}$$

$$Va(5a) = Vm(3) \frac{(Pa-\Delta P)}{Pstd} \qquad Qa = \frac{Vstd}{\Delta t}$$

Standard Conditions:

Tstd= 25°C= 298.18°K
Pstd= 760mm of Hg

For additional information consult:

1. The Federal Register. Vol.47. No. 234. pp. 54896-54921. December 6, 1982.
2. Quality Assurance Handbook. Vol.II (EPA 600/4-77-277a). Section 2.11.
3. Graseby/GMW/Andersen Instruction Manual.

Notes:

1. EPA recommends calibrators should be recalibrated after one year of field use.

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MFC SAMPLER CALIBRATION DATA SHEET

NORTH AMERICAN WEATHER CONSULTANTS
A TRC Company

Station Location: NAWC | Date: 9/13/93 | Time: 0800
Sampler Model: GMW 1076 | S/N: TSP-1 | Operator: TGW

Before or After Adjustment? Before

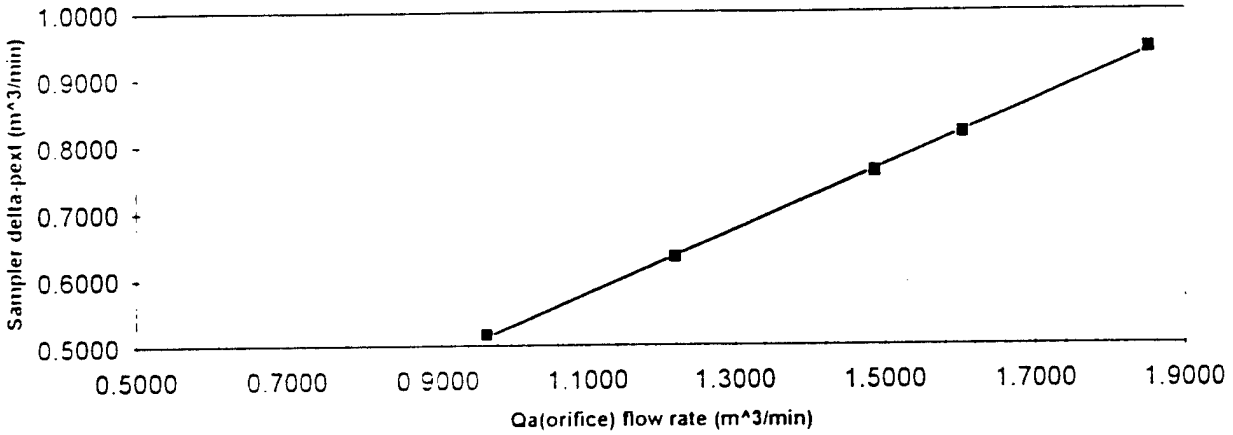
Pa(mm Hg)	656.7	Ta (°C)	19.0	Ta (°K)	292.2
Ps(mm Hg)	656.7	Ts (°C)	19.0	Ts (°K)	292.2

Wx Cond: In building

Orifice S/N: 8100587 | Calibration Date: 5/3/93

Orifice cal relationship: m = 1.2700 | b = -0.0142 | r = 0.99990

Flow Rate Setting	Orifice Delta H2O (in)	X axis = Qa(orifice) flow rate (m^3/min) (1)	Sampler Delta-Pex (inches of H2O)	Y axis = Sampler Delta-Pext (m^3/min) (2)
1	12.3	1.8531	2.0	0.9433
2	9.2	1.6042	1.5	0.8169
3	7.9	1.4874	1.3	0.7605
4	5.3	1.2203	0.9	0.6328
5	3.3	0.9653	0.6	0.5167



(1) Qa(Orifice) = {[(Delta-H20)(Ta/Pa)]^1/2-b} (1/m)

(2) Delta-Pext = [Delta-Pex(Ta/Pa)]^1/2

m = orifice slope b = orifice intercept

Sampler Calibration Relationship (Qa on x-axis; Delta-Pext on y-axis):

m (slope) = 0.4798 | b (intercept) = 0.0497 | r (correlation) = 0.99975

For later calculation of sampler flow rate:

Qa(sampler) = {[average Delta-Pex*(Ta/Pa)]^1/2 - b} { 1/m}

(Use avg pre- and post sampling flow rate (in. H2O), temp (K) and site elevation pressure (mm Hg))

Set point flow rate (SFR) = 1.1300 | Sampler set point (SSP) = 0.7877

SFR (m^3/min) = 1.13 (Ps/Pa)(Ta/Ts)

SSP (in. H2O) = [Pa/Ta][m(SFR) + b]^2

MFC SAMPLER CALIBRATION DATA SHEET

NORTH AMERICAN WEATHER CONSULTANTS
A TRC Company

Station Location: NAWC
Sampler Model: GMW 1076
Date: 9/13/93
S/N: TSP-2
Time: 1800
Operator: TGW

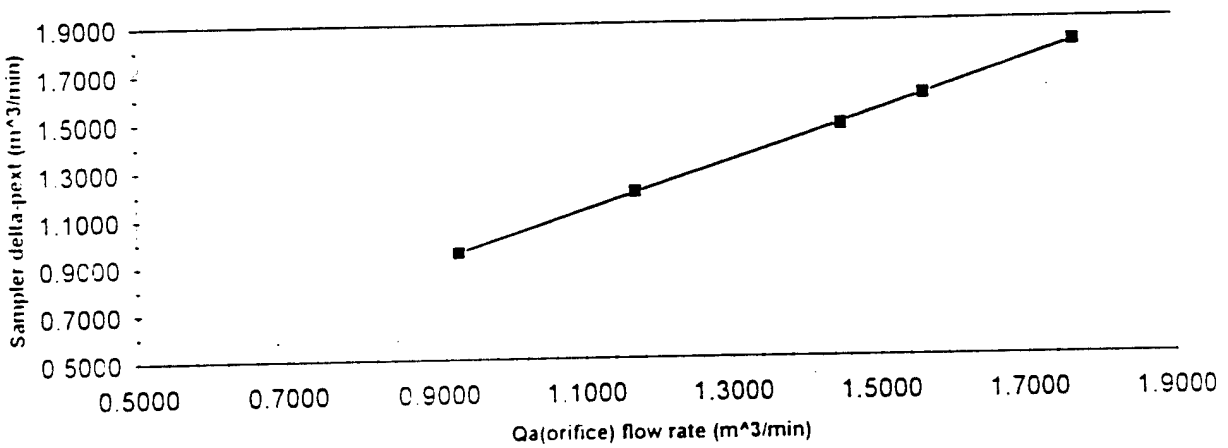
Before or After Adjustment? Before

Pa(mm Hg)	653.8	Ta (°C)	22.3	Ta (°K)	295.5
Ps(mm Hg)	653.8	Ts (°C)	22.3	Ts (°K)	295.5

Wx Cond: In building

Orifice S/N: 8100587
Calibration Date: 5/3/93
Orifice cal relationship: m = 1.2700 b = -0.0142 r = 0.99990

Flow Rate Setting	Orifice Delta H2O (in)	X axis = Qa(orifice) flow rate (m^3/min) (1)	Sampler Delta-Pex (inches of H2O)	Y axis = Sampler Delta-Pext (m^3/min) (2)
1	11.0	1.7667	7.2	1.8038
2	8.6	1.5635	5.6	1.5908
3	7.4	1.4511	4.8	1.4728
4	4.8	1.1709	3.2	1.2025
5	3.0	0.9280	2.0	0.9507



(1) Qa(Orifice) = {[(Delta-H20)(Ta/Pa)]^1/2-b} {1/m}

(2) Delta-Pext = [Delta-Pex(Ta/Pa)]^1/2

m = orifice slope b = orifice intercept

Sampler Calibration Relationship (Qa on x-axis; Delta-Pext on y-axis):

m (slope) = 1.0105 b (intercept) = 0.0137 r (correlation) = 0.99987

For later calculation of sampler flow rate:

Qa(sampler) = {[average Delta-Pex*(Ta/Pa)]^1/2 - b} { 1/m}

(Use avg pre- and post sampling flow rate (in. H2O), temp (K) and site elevation pressure (mm Hg))

Set point flow rate (SFR) 1.1300 Sampler set point (SSP) 2.9546

SFR (m^3/min) = 1.13 (Ps/Pa)(Ta/Ts)

SSP (in. H2O) = [Pa/Ta][m(SFR) + b]^2

MFC SAMPLER CALIBRATION DATA SHEET

NORTH AMERICAN WEATHER CONSULTANTS
A TRC Company

Station Location	NAWC	Date	9/13/93	Time	1800
Sampler Model	GMW 1076	S/N	TSP-3	Operator	TGW

Before or After Adjustment? Before

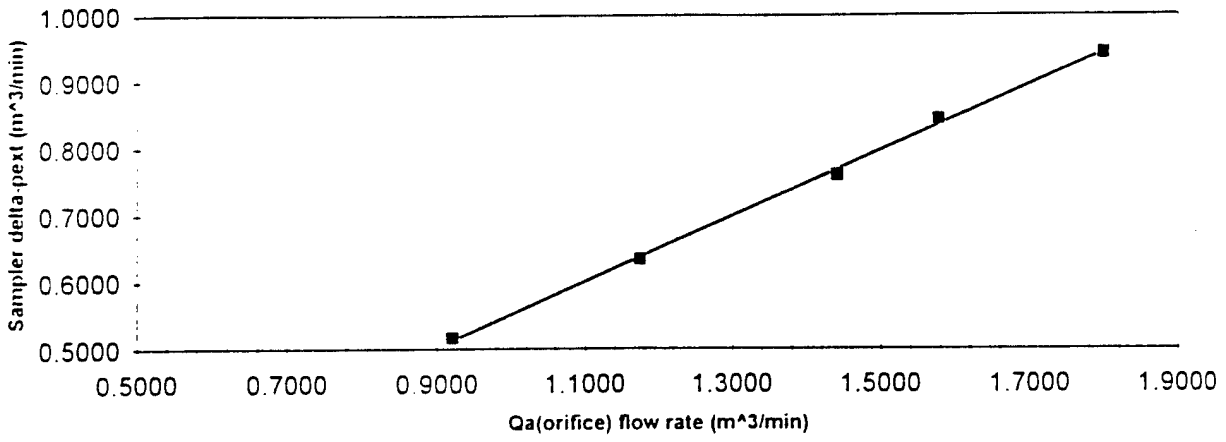
Pa(mm Hg)	656.7	Ta (°C)	19.0	Ta (°K)	292.2
Ps(mm Hg)	656.7	Ts (°C)	19.0	Ts (°K)	292.2

Wx Cond: In building

Orifice S/N 8100587 Calibration Date 5/3/93

Orifice cal relationship: m = 1.2700 b = -0.0142 r = 0.99990

Flow Rate Setting	Orifice Delta H2O (in)	X axis = Qa(orifice) flow rate (m^3/min) (1)	Sampler Delta-Pex (inches of H2O)	Y axis = Sampler Delta-Pext (m^3/min) (2)
1	11.6	1.7999	2.0	0.9433
2	8.9	1.5780	1.6	0.8437
3	7.4	1.4399	1.3	0.7605
4	4.9	1.1738	0.9	0.6328
5	3.0	0.9209	0.6	0.5167



(1) Qa(Orifice) = {[(Delta-H20)(Ta/Pa)]^1/2-b} {1/m}

(2) Delta-Pext = [Delta-Pex(Ta/Pa)]^1/2

m = orifice slope b = orifice intercept

Sampler Calibration Relationship (Qa on x-axis; Delta-Pext on y-axis):

m (slope) = 0.4906 b (intercept) = 0.0611 r (correlation) = 0.99933

For later calculation of sampler flow rate:

Qa(sampler) = {[average Delta-Pex*(Ta/Pa)]^1/2 - b} { 1/m}

(Use avg pre- and post sampling flow rate (in. H2O), temp (K) and site elevation pressure (mm Hg))

Set point flow rate (SFR) 1.1300 Sampler set point (SSP) 0.8515

SFR (m^3/min) = 1.13 (Ps/Pa)(Ta/Ts)

SSP (in. H2O) = [Pa/Ta][m(SFR) + b]^2

MFC SAMPLER CALIBRATION DATA SHEET

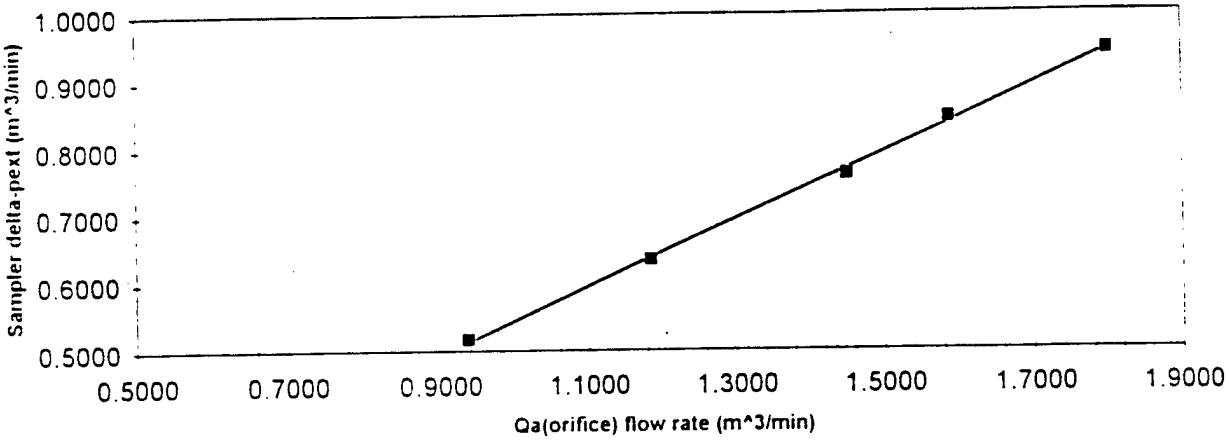
NORTH AMERICAN WEATHER CONSULTANTS
A TRC Company

Station Location: NAWC
Sampler Model: GMW 1076
Date: 9/13/93
S/N: TSP-4
Time: 1800
Operator: TGW

Before or After Adjustment? Before
Pa(mm Hg): 656.7
Ps(mm Hg): 656.7
Ta (°C): 19.0
Ts (°C): 19.0
Ta (°K): 292.2
Ts (°K): 292.2
Wx Cond: In building

Orifice S/N: 8100587
Calibration Date: 5/3/93
Orifice cal relationship: m = 1.2700
b = -0.0142
r = 0.99990

Flow Rate Setting	Orifice Delta H2O (in)	X axis = Qa(orifice) flow rate (m^3/min) (1)	Sampler Delta-Pex (inches of H2O)	Y axis = Sampler Delta-Pext (m^3/min) (2)
1	11.6	1.7999	2.0	0.9433
2	9.0	1.5868	1.6	0.8437
3	7.5	1.4495	1.3	0.7605
4	5.0	1.1856	0.9	0.6328
5	3.1	0.9359	0.6	0.5167



(1) Qa(Orifice) = {[(Delta-H20)(Ta/Pa)]^1/2-b} {1/m}
(2) Delta-Pext = [Delta-Pex(Ta/Pa)]^1/2

m = orifice slope
b = orifice intercept

Sampler Calibration Relationship (Qa on x-axis; Delta-Pext on y-axis):

m (slope) = 0.4981
b (intercept) = 0.0462
r (correlation) = 0.99937

For later calculation of sampler flow rate:

Qa(sampler) = {[average Delta-Pex*(Ta/Pa)]^1/2 - b} { 1/m}

(Use avg pre- and post sampling flow rate (in. H2O), temp (K) and site elevation pressure (mm Hg))

Set point flow rate (SFR): 1.1300
Sampler set point (SSP): 0.8339

SFR (m^3/min) = 1.13 (Ps/Pa)(Ta/Ts)
SSP (in. H2O) = [Pa/Ta][m(SFR) + b]^2

MFC SAMPLER CALIBRATION DATA SHEET

NORTH AMERICAN WEATHER CONSULTANTS
A TRC Company

Station Location	NAWC	Date	9/13/93	Time	1800
Sampler Model	GMW 1076	S/N	TSP-5	Operator	TGW

Before or After Adjustment? Before

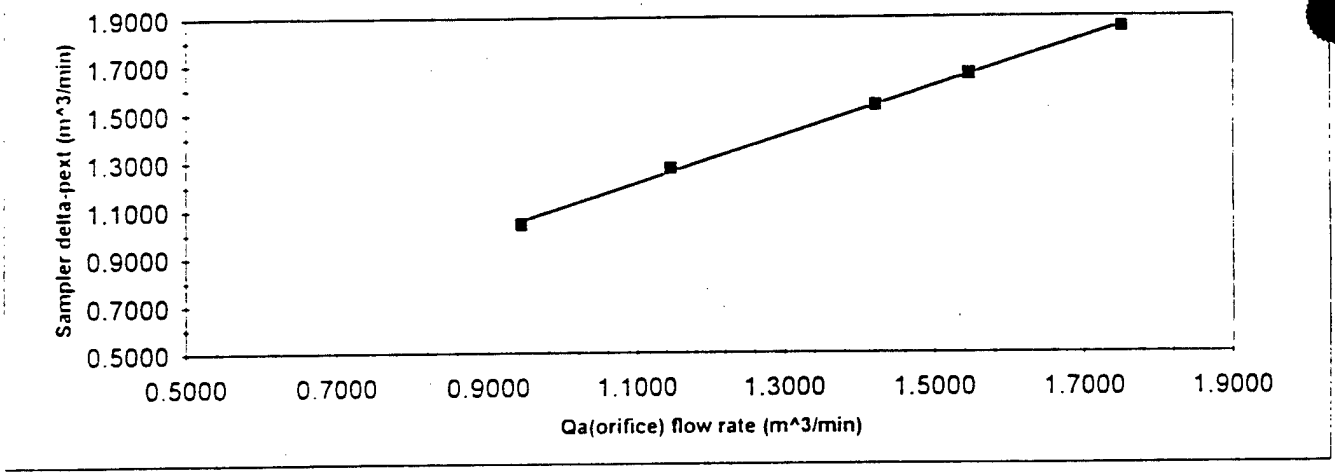
Pa(mm Hg)	653.8	Ta (°C)	22.3	Ta (°K)	295.5
Ps(mm Hg)	653.8	Ts (°C)	22.3	Ts (°K)	295.5

Wx Cond: In building

Orifice S/N 8100587 Calibration Date 5/3/93

Orifice cal relationship: m = 1.2700 b = -0.0142 r = 0.99990

Flow Rate Setting	Orifice Delta H2O (in)	X axis = Qa(orifice) flow rate (m^3/min) (1)	Sampler Delta-Pex (inches of H2O)	Y axis = Sampler Delta-Pext (m^3/min) (2)
1	10.8	1.7507	7.6	1.8532
2	8.4	1.5453	6.1	1.6603
3	7.1	1.4216	5.2	1.5329
4	4.6	1.1465	3.6	1.2755
5	3.1	0.9432	2.4	1.0414



(1) Qa(Orifice) = {[(Delta-H20)(Ta/Pa)]^1/2-b} {1/m}

(2) Delta-Pext = [Delta-Pex(Ta/Pa)]^1/2

m = orifice slope b = orifice intercept

Sampler Calibration Relationship (Qa on x-axis; Delta-Pext on y-axis):

m (slope) = 0.9973 b (intercept) = 0.1149 r (correlation) = 0.99930

For later calculation of sampler flow rate:

Qa(sampler) = {[average Delta-Pex*(Ta/Pa)]^1/2 - b} { 1/m}

(Use avg pre- and post sampling flow rate (in. H2O), temp (K) and site elevation pressure (mm Hg))

Set point flow rate (SFR) 1.1300 Sampler set point (SSP) 3.4126

SFR (m^3/min) = 1.13 (Ps/Pa)(Ta/Ts) SSP (in. H2O) = [Pa/Ta][m(SFR) + b]^2

APPENDIX B

TSP Flow Check Procedure and Results

FIELD QC FLOW-CHECK

FIELD QC PROCEDURE

For HV TSP samplers, a field-calibration check of the operational flow rate is recommended at least once per month. The purpose of this check is to track the sampler's calibration stability. A control chart (e.g., Figure 1) presenting the percentage difference between a sampler's indicated and measured flow rates should be maintained. This chart provides a quick reference of instrument flow rate drift problems and is useful for tracking the performance of the sampler. Either the sampler log book or a data sheet must be used to document flow-check information. This information includes, but is not limited to instrument and transfer standard model and serial numbers, ambient temperature and pressure conditions, and collected flow-check data (e.g., Figure 2).

In this subsection, the following is assumed:

- The flow rate through a TSP sampler that is equipped with a mass-flow controller is indicated by the exit orifice plenum pressure. This pressure is measured with a manometer.
- The sampler should operate at a flow rate between 1.1 and 1.7 m^3/min (39-60 ft^3/min).
- The transfer standard will be an orifice device equipped with a water or oil manometer.
- The orifice transfer standard's calibration relationship is in terms of the actual volumetric flow rate (Qa).

QC FLOW-CHECK PROCEDURE - MFC SAMPLER

The indicated flow rate (Qa (sampler)) for MFC samplers is calculated by determining (a) the manometer reading of the exit orifice plenum pressure, (b) the ambient temperature (Ta), and (c) the barometric pressure)Pa) during the flow check. These values are then applied to the sampler's calibration relationship. The 4 inch pressure (flow) recorders of the type often supplied with HV TSP_{10} samplers are generally not sufficiently accurate and are not recommended for quantitative sampler pressure or flow measurements. The flow recorder may be connected in parallel with the manometer or other pressure measuring device, using a tee or "Y" tubing connector.

Note: Do not attempt to conduct a flow check of TSP_{10} samplers under windy conditions. Short-term wind velocity fluctuations will produce variable pressure readings by the orifice transfer standard's manometer. The flow check will be less precise because of the pressure variations.

1. Collect the following equipment and transport it to the monitoring station. This equipment may be the same equipment as used for calibrations.

   - A water or oil manometer with a 0- to 200-mm (0- to 8-in.) range and a minimum scale division of 1 mm (0.1 in.) for measurement of the sampler's exit orifice plenum pressure. This manometer should be the same as is used routinely for sampler flow rate measurements.

   - An orifice transfer standard and its calibration relationship.

   - An associated water or oil manometer with a 0- to 400-mm (0- to 16 in.) range and a minimum scale division of 1 mm (0.1 in.) for measurement of the orifice transfer standard.

   - A thermometer capable of accurately measuring temperature over the range of 0° to 50°C (273 to 323 K) to the nearest ± 1°C and referenced to an NIST or ASTM thermometer within ± 2°C at least annually.

   - A portable aneroid barometer (e.g., a climber's or engineer's altimeter) capable of accurately measuring ambient pressure over the range of 500 to 800 mm Hg (66 to 106 kPa) to the nearest millimeter Hg and referenced within ± 5 mm Hg of a barometer of known accuracy at least annually.

     OR:

     - The elevation of the site converted to barometric pressure.

   - The sampler's calibration information.

   - Spare recorder charts and a clean flow-check filter.

   - MFC Sampler Flow-Check Data Sheet or site log book.

2. MFC samplers are normally flow-checked with a filter in line (i.e., between the orifice transfer standard and the motor). Install a clean filter in the sampler. Place the filter directly upon a the sampler's filter screen. Do not use a filter cassette.

3. Install the orifice transfer standard and its faceplate on the sampler. Do not restrict the flow rate through the orifice (i.e., by using fixed-resistance plates or closing the variable-resistance valve).

   Caution: Tighten the faceplate nuts on alternate corners first to eliminate leaks and to ensure even tightening. The nuts should be hand-tightened; too much compression can damage the sealing gasket. Make sure the orifice transfer standard gasket is in place and the orifice transfer standard is not cross-threaded on the faceplate.

4. Connect the orifice manometer to the pressure port of the orifice transfer standard and the sampler manometer to the sampler's exit orifice plenum. Inspect the manometers' connecting tubing for crimps and cracks. Open the manometer valves and blow gently through the tubing. Watch for the free flow of fluid. Adjust the manometers' scale so that their zero lines are at the bottom of the meniscuses. Make sure that the connecting tubing snugly fits the manometer and the pressure port.

5. Turn on the sampler and allow it to warm up to operating temperature (3 to 5 min).

   Note: The sampler inlet may be partially lowered over the orifice transfer standard to act as a draft shield (if a shield is not otherwise provided). Use a block to provide at least 2 inches of clearance at the bottom for air flow and for the manometer tubing.

6. Read and record the following parameters on the MFC Sampler Flow-Check Data Sheet:

   - Sampler location and date.
   - Sampler model and S/N.
   - Ambient temperature (Ta), °C, and K.
   - Ambient barometric pressure (Pa), mm Hg or kPa.
   - Unusual weather conditions.
   - Orifice transfer standard S/N and calibration relationship.
   - Operator's signature.

7. Observe the $\blacktriangle H_2O$ across the orifice by reading the manometer deflection. Record the manometer deflection on the MFC Sampler Flow-Check Data Sheet.

8. Measure the exit orifice plenum pressure ($\blacktriangle$Pex) by reading the manometer deflection. Record the manometer deflection on the MFC Sampler Flow-Check Data Sheet.

9. Turn off the sampler and remove the orifice transfer standard, but not the filter. Turn on the sampler and repeat Step 8 to check the flow rate under normal operating conditions. Turn off the sampler and remove the filter.

10. Calculate and record Qa (orifice) at actual conditions using the following equation:

$$Qa(orifice) = \{[(\blacktriangle H_2O)(Ta/Pa)]^{1/2}-b\}\ \{1/m\}$$

where

Qa(orifice)	=	actual volumetric flow rate as indicated by the orifice transfer standard, m^3/min
$\blacktriangle H_2O$	=	pressure drop across the orifice, in. H_2O
Ta	=	ambient temperature, K
Pa	=	ambient barometric pressure, mm Hg or kPa
b	=	intercept of the orifice calibration relationship
m	=	slope of the orifice calibration relationship

11. Calculate and record the corresponding sampler flow rate at actual conditions and record.

$$Qa(sampler) = \{[\blacktriangle Pex\ (Ta/Pa)]^{1/2}-b\}\ \{1/m\}$$

where

Qa(orifice)	=	sampler flow rate, actual m^3/min
$\blacktriangle$ Pex	=	exit orifice plenum pressure, in. H_2O
Ta	=	ambient temperature during the flow check, K (K=°C+ 273)
Pa	=	ambient barometric pressure during the flow check, mmHg or kPa
b	=	intercept of the orifice calibration relationship
m	=	slope of the orifice calibration relationship

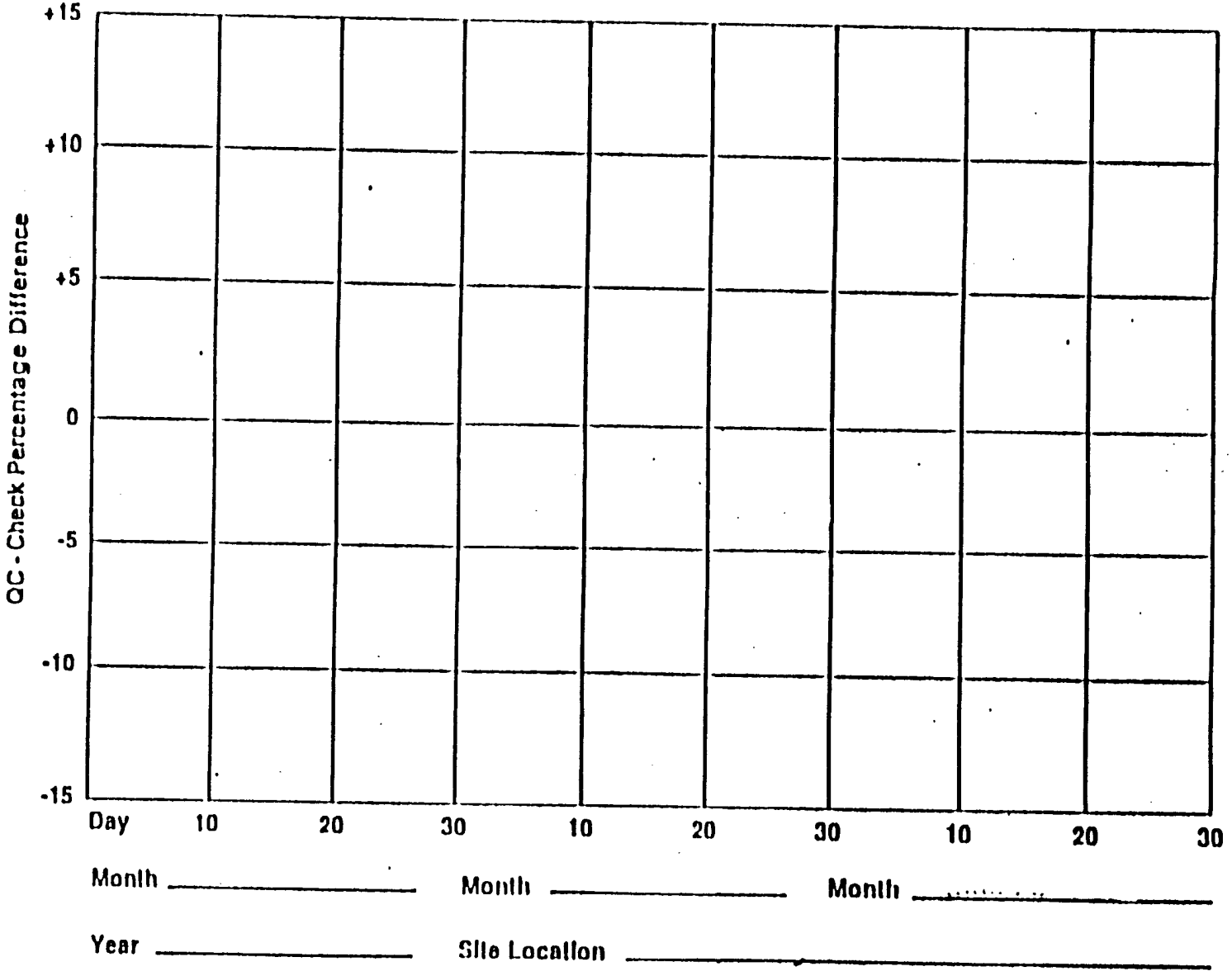
12. Using this information and the formulas provided on the MFC Sampler Flow-Check Data Sheet, calculate the QC check percentage differences.

$$Qa\text{-}check\ \%\ difference = \left[\frac{Qa(sampler) - Qa(orifice)}{Qa(orifice)}\right][100]$$

where Qa(sampler) is measured with the orifice transfer standard being installed

Record this value on the MFC Sampler Flow-Check Data Sheet and plot on the QC control chart. If the sampler flow rate is within 93 to 107 percent (±7 percent difference) of the calculated Qa(orifice) flow rate (in actual volumetric units), the sampler

calibration is acceptable. If these limits are exceeded, investigate and correct any malfunction. Recalibrate the sampler before sampling is resumed. Differences exceeding $\pm$10 percent may result in the invalidation of all data collected subsequent to the last calibration or valid flow check. Before invalidating any data, double-check the orifice transfer standard's calibration and all calculations.



Example QC control chart for QC flow checks.

Figure 1

MFC SAMPLER FLOW CHECK DATA SHEET

Station Location _____ Date _____ Time _____

Sampler Model _____ S/N _____ Operator _____

Pa _____ mm Hg, Ta _____ °C _____ K, Unusual Conditions _____

Orifice S/N _____ Orifice Calibration Date _____

Orifice Calibration Relationship: m = _____ b = _____ r = _____

Sampler Calibration Relationship: m = _____ b = _____ r = _____

Orifice Pressure Drop (ΔH_2O) _____ in. H_2O Qa (Orifice)[a] _____ m^3/min

	With Orifice Installed	Without Orifice Installed
Sampler Pressure Drop (ΔP_{ex})	_____ in. H_2O	_____ in. H_2O
Qa (sampler)[b]	_____ m^3/min	_____ m^3/min

CC—Check Percentage Difference[c] _____ %

---

[a]For calculation of orifice flow rates:

$Qa\ (orifice) = \{[\Delta(H_2O)\ (Ta/Pa)]^{1/2} - b\}\ \{1/m\}$

[b]For calculation of sampler flow rates:

$Qa\ (sampler) = \{[(\Delta P_{ex}/Pa)\ (Ta - 30)]^{1/2} - b\}\ \{1/m\}$

[c]CC % Difference $= \left[\frac{Qa\ (sampler) - Qa\ (orifice)}{Qa\ (orifice)}\right] [100]$ where Qa (sampler) is measured with the orifice installed

Example MFC sampler flow check data sheet.

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MFC SAMPLER FLOW CHECK DATA SHEET

Station Location: TAD - SITE #1 Date: 11-11-93 Time: 1045

Sampler Model: GMW-TSP S/N: TSP #2 Operator: WJH

Pa: 629 mm Hg. Ta: 7.5 °C 280.5 K. Unusual Conditions: BROKEN NNW 1-3MPH

Orifice S/N: 8100582. Orifice Calibration Date: 5-3-93

Orifice Calibration Relationship: m = 1.27 b = -0.0142 r = .9999

Sampler Calibration Relationship: m = 1.0105 b = .0137 r = .9998

Orifice Pressure Drop (ΔH_2O): 7.3 in. H_2O Qa (Orifice)[a]: 1.4319 m^3/min

	With Orifice Installed	Without Orifice Installed
Sampler Pressure Drop (ΔPac)	4.9 in. H_2O	6.0 in. H_2O
Qa (sampler)[b]	1.4493 m^3/min	1.6052 m^3/min

CC—Check Percentage Difference[c]: 1.2 %

ETM = 17939

MFC = SIERRA 310 #1729
MOTOR = B/M 2000H #3734
DIXON RECORDER 105 # 0588-2144

[a]For calculation of orifice flow rates:

Qa (orifice) = $\{[\Delta(H_2O)(Ta/Pa)]^{1/2} - b\}$ {1/m} (Use orifice slope and intercept)

[b]For calculation of sampler flow rates:

Qa (sampler) = $\{[\Delta P_a(Ta/Pa)]^{1/2} - b\}$ {1/m} (Use sampler slope and intercept)

[c]CC % Difference = $\left[\frac{Qa\ (sampler) - Qa\ (orifice)}{Qa\ (orifice)}\right]$ [100] where Qa (sampler) is measured with the orifice installed

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MFC SAMPLER FLOW CHECK DATA SHEET

Station Location TAD - SITE #2 Date 11-11-93 Time 1140

Sampler Model GMW-TSP S/N TSP #5 Operator WJH

Pa 628 mm Hg. Ta 6.8 °C 279.8 K. Unusual Conditions BROKEN NNW 1 MPH

Orifice S/N 8100587. Orifice Calibration Date 5-3-93

Orifice Calibration Relationship: m = 1.27 b = -0.0142 r = .9999

Sampler Calibration Relationship: m = .9973 b = .1149 r = .9993

Orifice Pressure Drop (ΔH_2O) 6.2 in. H_2O Qa (Orifice)[a] 1.319 m^3/min

	With Orifice Installed	Without Orifice Installed
Sampler Pressure Drop (ΔP_{ex})	4.5 in. H_2O	5.25 in. H_2O
Qa (sampler)[b]	1.3046 m^3/min	1.418 m^3/min

QC—Check Percentage Difference[c] -1.2 %

MOTOR = GMW B/M 2000H #3732
RECORDER = DIXON 107 #46735
MFC = SIERRA 310 #2063

[a] For calculation of orifice flow rates:

Qa (orifice) = $\{[\Delta(H_2O)\,(Ta/Pa)]^{1/2} - b\}\,\{1/m\}$ (Use orifice slope and intercept)

[b] For calculation of sampler flow rates:

Qa (sampler) = $\{[\Delta P_{ex}(Ta/Pa)]^{1/2} - b\}\,\{1/m\}$ (Use sampler slope and intercept)

[c] QC % Difference = $\left[\frac{Qa\ (sampler) - Qa\ (orifice)}{Qa\ (orifice)}\right]\,[100]$ where Qa (sampler) is measured with the orifice installed

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MFC SAMPLER FLOW CHECK DATA SHEET

Station Location TAD - SITE #3 Date 11-11-93 Time 1220

Sampler Model GMW-TSP S/N TSP #1 Operator WJH

Pa 628 mm Hg. Ta 6.8 °C 279.8 K. Unusual Conditions POOR NNW 1-3

Orifice S/N 8100587. Orifice Calibration Date 5-3-93

Orifice Calibration Relationship: m = 1.27 b = -0.0142 r = .9999

Sampler Calibration Relationship: m = .4798 b = .0497 r = .9998

Orifice Pressure Drop (ΔH_2O) 8.6 in. H_2O Qa (Orifice)[a] 1.5525 m^3/min

	With Orifice Installed	Without Orifice Installed
Sampler Pressure Drop (ΔP_{ax})	1.35 in. H_2O	1.7 in. H_2O
Qa (sampler)[b]	1.5128 m^3/min	1.7103 m^3/min
QC—Check Percentage Difference[c]	-2.6 %	ETM = 58023.6

MFC = SIERRA 310 #1731
RECORDER = GRASEBY 105 #6743
MOTOR = GMW #15678
TIMER GMW 76 #0942

[a] For calculation of orifice flow rates:

Qa (orifice) = $\{[\Delta(H_2O)(Ta/Pa)]^{1/2} - b\}\{1/m\}$ (Use orifice slope and intercept)

[b] For calculation of sampler flow rates:

Qa (sampler) = $\{[\Delta P_{ax}(Ta/Pa)]^{1/2} - b\}\{1/m\}$ (Use sampler slope and intercept)

[c] QC % Difference = $\left[\frac{Qa\ (sampler) - Qa\ (orifice)}{Qa\ (orifice)}\right][100]$ where Qa (sampler) is measured with the orifice installed

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MFC SAMPLER FLOW CHECK DATA SHEET

Station Location TAD - SITE-#4 Date 11-11-93 Time 1253

Sampler Model CMW-TSP S/N TSP#3 Operator WJH

Pa 628 mm Hg. Ta 6.6 °C 279.6 K. Unusual Conditions OVERCAST NNW 1-3

Orifice S/N 8100587. Orifice Calibration Date 5-3-93

Orifice Calibration Relationship: m = 1.27 b = -0.0142 r = .9999

Sampler Calibration Relationship: m = .4906 b = .0611 r = .9993

Orifice Pressure Drop (ΔH_2O) 8.1 in. H_2O Qa (Orifice)[a] 1.5065 m^3/min

	With Orifice Installed	Without Orifice Installed
Sampler Pressure Drop (ΔP_{ex})	1.4 in. H_2O	1.75 in. H_2O
Qa (sampler)[b]	1.48447 m^3/min	1.67447 m^3/min
QC—Check Percentage Difference[c]	-1.44 %	ETM = 41956.9

MFC = SIERRA 310 #2058
MOTOR = CMW #18166

---

[a] For calculation of orifice flow rates:

Qa (orifice) = $\{[\Delta(H_2O)\,[Ta/Pa]]^{1/2} - b\}\,\{1/m\}$ (Use orifice slope and intercept)

[b] For calculation of sampler flow rates:

Qa (sampler) = $\{[\Delta P_{ex}(Ta/Pa)]^{1/2} - b\}\,\{1/m\}$ (Use sampler slope and intercept)

[c] QC % Difference = $\left[\frac{Qa\ (sampler) - Qa\ (orifice)}{Qa\ (orifice)}\right]\,[100]$ where Qa (sampler) is measured with the orifice installed

MFC SAMPLER FLOW CHECK DATA SHEET

Station Location _____ Date 11/24/93 Time _____

Sampler Model _____ S/N _____ Operator _____

Pa _____ mm Hg, Ta _____ °C _____ K, Unusual Conditions _____

Orifice S/N 810784 Orifice Calibration Date 11/16/93

Orifice Calibration Relationship: m = 1.06 b = -0.026 r = 0.999992

Sampler Calibration Relationship: m = 1.3586 b = 0.1111 r = 0.999993

Orifice Pressure Drop (ΔH_2O) 4.2 in. H_2O Qa (Orifice)[a] 1.2928 m^3/min

	With Orifice Installed	Without Orifice Installed
Sampler Pressure Drop (ΔPex)	4.4 in. H_2O	5.8 in. H_2O
Qa (sampler)[b]	0.9173 m^3/min	1.0866 m^3/min

QC—Check Percentage Difference[c] _____ %

Qa (corrected sampler)[d] _____ m^3/min

Design Flow Rate Percentage Difference[e] _____ %

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[a]For calculation of orifice flow rates:

$Qa\ (orifice) = \{[\Delta(H_2O)\ (Ta/Pa)]^{1/2} - b\}\ \{1/m\}$

[b]For calculation of sampler flow rates:

$Qa\ (sampler) = \{[(\Delta Pex/Pa)\ (Ta + 30)]^{1/2} - b\}\ \{1/m\}$

[c]$QC\ \%\ Difference = \left[\frac{Qa\ (sampler) - Qa\ (orifice)}{Qa\ (orifice)}\right]\ [100]$ where Qa (sampler) is measured with the orifice installed

[d]$Qa\ (corrected\ sampler) = Qa\ (sampler)\left[\frac{100 - QC\ \%\ difference}{100}\right]$ where Qa (sampler) is measured without the orifice installed.

[e]$Design\ Flow\ Rate\ \%\ Difference = \left[\frac{Qa\ (corr.\ sampler) - 1.13}{1.13}\right]\ [100]$

Figure 3.5. Example MFC sampler flow check data sheet.

APPENDIX C

TSP Performance Audit Procedures and Results

NAWC

North American Weather Consultants
Standard Operating Procedure

FLOW RATE PERFORMANCE AUDIT PROCEDURE FOR MASS-FLOW-CONTROLLED (MFC) HV TSP SAMPLERS

Approval	Date	Concurred By	Date

A. INTRODUCTION

For this MFC procedure, the following conditions are assumed:

- The MFC sampler utilizes an electronic mass-flow controller for flow rate control.
- The sampler's flow rate is measured by a water or oil manometer connected to the exit orifice plenum pressure port.
- The sampler operates at a flow rate range of 1.1 to 1.7 m^3/min (39-60 ft^3/min).
- The calibrated, NIST-traceable audit transfer standard is an orifice device with an associated water or oil manometer.
- The audit orifice transfer standard's calibration relationship is expressed in actual volumetric flow rate units (Qa).

Note: If possible, avoid attempting to audit HV TSP samplers under windy conditions. Short-term wind velocity fluctuation will produce variable pressure readings by the audit orifice transfer standard's manometer. The audit will be less precise because of the pressure variations.

B. PROCEDURES

The auditor should adhere to the following procedures during an audit of the MFC sampler:

1. Transport the following equipment to the monitoring site:

   - Audit orifice transfer standard with calibration relationship in actual volumetric flow rate (i.e., Qa) units and traceable to NIST. This orifice transfer standard should not be the same one that is used for routine calibrations and QC flow checks.
   - An associated water or oil manometer, with a 0 to 400 mm (0 to 16 in.) range and minimum scale divisions of 1 mm (0.1 in.).
   - A thermometer, capable of accurately measuring temperature over an appropriate range to the nearest ± 1°C and referenced to an NIST or ASTM thermometer within ± 2°C at least annually.
   - A portable aneroid or digital barometer capable of accurately measuring ambient barometric pressure over the range of approximately 500 to 800 mm Hg (66 to 106 kPa) to the nearest mm Hg and referenced within ± 5 mm Hg to a barometer of known accuracy at least annually.
   - MFC Sampler Audit Data Sheet.
   - Clean filter and clean recorder chart.
   - Laptop computer.

   Note: The site operator is responsible for providing the manometer (or other device) that is normally used for measuring the sampler's flow rate, the sampler calibration relationship that is currently in effect for determining the flow rate for sample periods, and any other information or equipment that is normally used to determine the sampler's indicated flow rate.

2. Instruct the operator to install a clean filter in the HV TSP sampler. DO NOT use a filter cassette; place the filter directly on the sampler filter screen.

3. Install the audit orifice transfer standard's faceplate on the sampler.

   Check that the gaskets are in good condition and have not deteriorated.

   Caution: Tighten the faceplate nuts evenly on alternate corners to properly align and uniformly seat the gaskets. The nuts should be hand-tightened only; too much compression can damage the sealing gaskets.

4. Install the audit orifice transfer standard with no resistance plate, or open the valve of a variable-resistance orifice wide open. For resistance plate orifices, make sure the orifice gasket is present and the audit orifice transfer standard is not cross-threaded on the faceplate.

5. Leak test the audit system. Block the orifice with a large-diameter rubber stopper, wide duct tape, or other suitable means. Seal the pressure port with a rubber cap or similar device. Turn on the sampler.

   Caution: Avoid running the sampler for longer than 30 s at a time with the orifice blocked. This precaution will reduce the chance that the motor will be overheated due to the lack of cooling air. Such overheating can shorten the motor's lifetime. It can raise temperatures to the point of defeating the electrical insulation, which could result in fire or electric shock to the user.

   Gently rock the orifice transfer standard and listen for a whistling sound that would indicate a leak in the system. A leak-free system will not produce an upscale response in the sampler's exit orifice manometer or flow recorder. Leaks are usually caused either by a damaged or missing gasket between the orifice transfer standard and the faceplate or by cross-threading of the orifice transfer standard on the faceplate. All leaks must be eliminated before proceeding with the calibration. When the system is determined to be leak-free, turn off the sampler and unblock the orifice.

6. Inspect the audit orifice manometer connecting tubing for crimps or cracks. Open the manometer valves fully and blow gently through the tubing, watching for the free flow of the fluid. Adjust the manometer sliding scale so that the zero line is at the bottom of the meniscuses. Connect the audit manometer to the pressure port on the orifice. Make sure the unconnected side of the manometer is open

to the atmosphere. Make sure that the tubing fits snugly on the pressure port and on the manometer.

7. Turn on the sampler and allow it to warm up to operating temperature (3 to 5 min).

   Note: The sampler inlet may be partially lowered over the audit orifice transfer standard to act as a draft shield (if a shield is not otherwise provided). Use a block to provide at least 2 inches of clearance at the bottom for air flow and for the manometer tubing.

8. Observe and record the following parameters on the MFC Sampler Audit Data Sheet:

   - Sampler location, date, time.
   - Sampler model and S/N, and calibration relationship.
   - Ambient temperature (Ta), K (K = °C + 273).
   - Ambient barometric pressure (Pa), mm Hg or kPa.
   - Unusual weather conditions.
   - Audit orifice transfer standard S/N and calibration information.

9. When the sampler has warmed up to operating temperature, observe the pressure drop across the orifice by reading the total manometer deflection, and record as $\blacktriangle H_2O$ on the audit data sheet.

10. Instruct the operator to read the sampler exit orifice manometer reading, ▲Pex, and record it on the data sheet.

11. Turn off the sampler and remove the audit orifice transfer standard, but do not remove the filter. Turn the sampler on again and repeat Step 10 for the normal operating flow rate.

12. Gather together all audit data, including the audit orifice transfer standard's calibration information, and the MFC sampler's calibration data.

13. Verify that the correct readings have been inscribed on the data sheet.

14. Determine the flow rate through the audit orifice transfer standard, as presented in the following equation:

$$Qa(audit) = \{[\Delta H_2O(Ta/Pa)]^{1/2} - b\}\{1/m\}$$

where:

Qa(audit)	=	actual volumetric flow rate as indicated by the audit orifice transfer standard, M^3/min,
H_2O	=	pressure drop across the orifice, in. H_2O
Ta	=	ambient temperature, K (K = °C+273),
Pa	=	ambient barometric pressure, mm Hg (or kPa),
b	=	intercept of the audit orifice transfer standard's calibration relationship, and
m	=	slope of the audit orifice transfer standard's calibration relationship.

15. Instruct the operator to calculate the sampler's indicated flow rate, Qa (sampler) with and without the orifice installed, as it is normally done, using the sampler's calibration relationship and record both Qa (sampler) values on the data sheet.

$$\overline{Qa} = \{[\overline{\Delta Pex}(Tav/Pav)]^{1/2} - b\}\{1/m\}$$

where:

$\overline{Qa}$	=	the sampler's average actual flow rate, m^3/min,
$\overline{\Delta Pex}$	=	average of initial and final sampler manometer readings, $(\Delta Pex_i + \Delta Pex_f)/2$, in. H_2O,
Tav	=	average ambient temperature for the sample period, K (K=°C + 273),
Pav	=	average ambient pressure for the sample period, mm Hg (or kPa),

b = intercept of the sampler calibration relationship, and

m = slope of the sampler calibration relationship.

16. Calculate the percentage difference between the sampler's indicated flow rate, Qa (sampler) with the orifice installed, and the corresponding audit flow rate, Qa (audit), determined from the audit orifice transfer standard as:

$$\text{Audit flow rate \% difference} = \left[\frac{Qa(sampler) - Qa(audit)}{Qa(audit)}\right][100]$$

17. Record the audit flow rate percentage difference on the data sheet. If the audit flow rate percentage difference is less than or equal to ± 7 percent, the sampler calibration is acceptable. Differences exceeding ± 7 percent require sampler recalibration. Differences exceeding ± 10 percent may result in invalidation of all data subsequent to the last calibration or valid flow check. Before invalidating any data, double-check the sampler's calibration, the audit orifice transfer standard's certification, and all calculations.

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MFC SAMPLER AUDIT DATA SHEET

Station Location TAD - SITE #1 Date 12-6-93 Time 1500

Sampler Model GMW - HiVOL S/N TSP #2

Pa 628.4 mm Hg. Ta 4.0 °C 277 K. Unusual Conditions BROKEN, NNW 1-3 MPH

Audit Orifice S/N 8022682. Orifice Calibration Date 11-16-93

Orifice Calibration Relationship: m = 1.25 b = -.0182 r = .9999

Sampler Calibration Relationship: m = .4981 b = .0462 r = .9994

Orifice Pressure Drop (ΔH_2O) 8.5 in. H_2O Qa (audit)[a] 1.56 m^3/min

	With Orifice Installed	Without Orifice Installed
Sampler Pressure Drop (ΔPex)	1.45 in. H_2O	1.75 in. H_2O
Qa (sampler)[b]	1.512 m^3/min	_____ m^3/min

Audit Flow Rate Percentage Difference[c] -3.1 %

ETM SETTING = 2095-7.0

MFC = SIERRA 310 #1729
MOTOR = B/H 2000H #3734
RECORDER MOD. 105 0588-2144

[a]For calculation of audit orifice standard flow rates:

Qa (audit) = $\{[\Delta(H_2O)\,(Ta/Pa)]^{1/2} - b\}\,\{1/m\}$ (Use orifice slope and intercept)

[b]For calculation of sampler flow rates:

Qa (sampler) = $\{[\Delta P_a(Ta/Pa)]^{1/2} - b\}\,\{1/m\}$ (Use sampler slope and intercept)

[c]Audit % Difference = $\left[\frac{Qa\ (sampler) - Qa\ (orifice)}{Qa\ (orifice)}\right][100]$ where Qa (sampler) is measured with the orifice installed.

Auditor Bill Hauze Observer TGW

WEATHER CONSULTANTS

MFC SAMPLER AUDIT DATA SHEET

Station Location TAD - SITE #2 Date 12-6-93 Time 1300-1325

Sampler Model GMW - HiVOL S/N TSP #5

Pa 628.4 mm Hg. Ta 6.5 °C 279.5 K. Unusual Conditions PC, NNW 1-3 MPH

Audit Orifice S/N 5022682. Orifice Calibration Date 11-16-93

Orifice Calibration Relationship: m = 1.75 b = -0.0182 r = .9999

Sampler Calibration Relationship: m = .9973 b = 0.1149 r = .9993

Orifice Pressure Drop (ΔH_2O) 6.2 in. H_2O Qa (audit)[a] 1.343 m^3/min

	With Orifice Installed	Without Orifice Installed
Sampler Pressure Drop (ΔPex)	4.65 in. H_2O	5.45 in. H_2O
Qa (sampler)[b]	1.327 m^3/min	1.446 m^3/min

Audit Flow Rate Percentage Difference[c] -1.2 %

ETM SETTING = 13748.2

MOTOR B/M 2000 H #3732
DICKSON RECORDER 107 # 46735
MFC = ACCUVOL 310 #2083

[a]For calculation of audit orifice standard flow rates:

Qa (audit) = $\{[\Delta(H_2O)\,(Ta/Pa)]^{1/2} - b\}\,\{1/m\}$ (Use orifice slope and intercept)

[b]For calculation of sampler flow rates:

Qa (sampler) = $\{[\Delta P_a(Ta/Pa)]^{1/2} - b\}\,\{1/m\}$ (Use sampler slope and intercept)

[c]Audit % Difference = $\left[\frac{\text{Qa (sampler)} - \text{Qa (orifice)}}{\text{Qa (orifice)}}\right][100]$ where Qa (sampler) is measured with the orifice installed.

Auditor Brian Hilwig Observer TGW

WEATHER CONSULTANTS

MFC SAMPLER AUDIT DATA SHEET

Station Location TAD - SITE #3 Date 12-6-93 Time 1335-1355

Sampler Model GMW-HiVOL S/N TSP #1

Pa 628.4 mm Hg. Ta 6.5 °C 279.5 K. Unusual Conditions PC, NNW 1-3 MPH

Audit Orifice S/N 802682. Orifice Calibration Date 11-16-93

Orifice Calibration Relationship: m = 1.25 b = -0.0182 r = .9999

Sampler Calibration Relationship: m = .4798 b = .0497 r = .9998

Orifice Pressure Drop (ΔH_2O) 9.0 in. H_2O Qa (audit)[a] 1.615 m^3/min

	With Orifice Installed	Without Orifice Installed
Sampler Pressure Drop (ΔPex)	1.5 in. H_2O	1.9 in. H_2O
Qa (sampler)[b]	1.599 m^3/min	1.812 m^3/min

Audit Flow Rate Percentage Difference[c] 0.99 %

ETM = 63814.5

DICKSON RECORDER = PR4 # 272059
MOTOR GMW # 15678
MFC = SIERRA 310 #1731 TIMER = MOD 76 # 0942

---

[a] For calculation of audit orifice standard flow rates:

Qa (audit) = $\{[\Delta(H_2O)(Ta/Pa)]^{1/2} - b\}\{1/m\}$ (Use orifice slope and intercept)

[b] For calculation of sampler flow rates:

Qa (sampler) = $\{[\Delta P_a(Ta/Pa)]^{1/2} - b\}\{1/m\}$ (Use sampler slope and intercept)

[c] Audit % Difference = $\left[\frac{Qa\ (sampler) - Qa\ (orifice)}{Qa\ (orifice)}\right][100]$ where Qa (sampler) is measured with the orifice installed.

Auditor Bill Hauss Observer TGW

WEATHER CONSULTANTS

MFC SAMPLER AUDIT DATA SHEET

Station Location TAD - SITE #4 Date 12-6-93 Time 1440 - 1453

Sampler Model GMW - HiVOL S/N TSP #3

Pa 628.4 mm Hg. Ta 6.5 °C 279.5 K. Unusual Conditions PC NNW 1-3MPH

Audit Orifice S/N 802682. Orifice Calibration Date 11-16-93

Orifice Calibration Relationship: m = 1.25 b = -0.0182 r = .9999

Sampler Calibration Relationship: m = .4906 b = .0611 r = .9993

Orifice Pressure Drop (ΔH_2O) 8.3 in. H_2O Qa (audit)[a] 1.55 m^3/min

	With Orifice Installed	Without Orifice Installed
Sampler Pressure Drop (ΔPex)	1.5 in. H_2O	1.8 in. H_2O
Qa (sampler)[b]	1.54 m^3/min	m^3/min

Audit Flow Rate Percentage Difference[c] -0.6 %

ETM = 47100.1

MFC = SIERRA 310 #2058
DIXON RECORDER 106 #31894
MOTOR = GMW #18166

[a] For calculation of audit orifice standard flow rates:

Qa (audit) = $\{[\Delta(H_2O)\,(Ta/Pa)]^{1/2} - b\}\,\{1/m\}$ (Use orifice slope and intercept)

[b] For calculation of sampler flow rates:

Qa (sampler) = $\{[\Delta P_a(Ta/Pa)]^{1/2} - b\}\,\{1/m\}$ (Use sampler slope and intercept)

[c] Audit % Difference = $\left[\frac{Qa\ (sampler) - Qa\ (orifice)}{Qa\ (orifice)}\right][100]$ where Qa (sampler) is measured with the orifice installed.

Auditor Bill Hrouz Observer TGW

APPENDIX D

NAWC Filter Laboratory Procedures
and Tare and Final Weight Results

NAWC

North American Weather Consultants
Standard Operating Procedure

FILTER LABORATORY PROCEDURES

Approval	Date	Concurred By	Date

This Standard Operating Procedure (SOP) is provided to instruct filter laboratory technicians in the selection, preparation, and weighing of micro-quartz or glass fiber filters for high volume sampling, and in net mass, PM_{10}, and TSP concentration determination.

Laboratory Equipment

The required laboratory equipment consists of the following:

- A Sartorius Analytical balance equipped to handle 8 X 10 inch filters, and having a sensitivity of 0.1 milligrams
- ASTM Class 1 weights, 3 and 5 gram
- Environmentally controlled (constant temperature and humidity) room and chamber
- Light table
- Hygrothermograph
- Calibrated and certified thermometer, and Assman Psychrometer
- Rotronics temperature and humidity device
- Disposable gloves, tweezers, camels hair brush
- Staticmaster brush and polonium ionizing units for static charge elimination.

BALANCE CALIBRATION

All filters will be weighed on a certified, calibrated balance. As a minimum, the balance will be calibrated and inspected annually by Heusser Instruments. The balance will be maintained according to manufacturer specifications. If the balance is not functioning properly, notification of Heusser Instruments will be made immediately and no filter weighings will be performed until the balance has been repaired and recalibrated, as necessary. The certification of balance calibration will be maintained in the master lab file located in the laboratory managers office.

FILTER PREPARATION

Glass fiber filters, Type AE, having a collection efficiency of $\geq$ 99% for particles of 0.3 μm diameter may be used. Type AE filters are manufactured from low acid and contain very low levels of zinc and iron. They are organic and binder free with a 1 μm nominal pore size.

Micro-quartz filters, having a collection efficiency of $\geq$ 99% as measured by the dioctyl phthalate (DOP) test with a 0.3 μm particles at the sampler's operating face velocity may also be used.

Each filter will be visually inspected on a light table by the laboratory technician for defects. Silicone treated filters have been found to have a static charge problem. Thus, to eliminate this problem, the Staticmaster brush will be brushed over the filters to decrease static and remove loose fibers. The technician will also look for the following defects:

1) Pinhole - A small hole appearing as a distinct and obvious bright point of light when examined over a light table.

2) Discoloration - Any obvious visible discoloration that might be evidence of contamination.

3) Filter nonuniformity - Any obvious visible nonuniformity in the appearance of the filter when viewed over a light table that might indicate gradations in porosity across the face of the filter.

4) Other - A filter with any imperfection not described above, such as irregular surfaces or other results of poor workmanship.

Place defective filters in filter box designated for unusable filters. After a sufficient quantity has been retained, return defective filters to supplier.

FILTER IDENTIFICATION

Assign a sequential serial identification number to each filter. For the 8 x 10 inch glass fiber filters, stamp this number on two diagonally opposite corners - one stamp on each side of the filters. The glass fiber filters will be identified by a five digit number.

Because it can be difficult to tell the rough side (top) of a micro-quartz filter, stamp two diagonally opposite corners on the smooth side (bottom) of the micro-quartz filters. The micro-quartz filters will be identified by a six digit number. If the laboratory technician is in doubt on which is the smooth side, please consult the laboratory manager.

All filters tend to be brittle. Thus, apply gentle pressure when stamping the filters. Take extreme care that filter numbers are not duplicated or missed. If a filter has been mis-marked, discard the filter.

FILTER EQUILIBRATION

Filters will be equilibrated in a conditioning environment for at least 24 hours before being weighed. Longer periods of equilibration will not affect weighing accuracy. The conditioning environment should be held constant with a mean value between 15 and 30°C, and not varying more than ± 3°C (5°F) during the equilibration period. The relative humidity (RH) should be held constant at a mean value between 20 and 45 percent, and not varying more than ± 5 percent during the equilibration period.

The temperature and RH will be checked on equilibration and weighing days but recorded continuously. A hygrothermograph will continuously record temperature and humidity conditions. The hygrothermograph record will be verified, prior to filter weighing, by a Rotronics temperature and humidity sensor. The Rotronics temperature and humidity sensor will be verified against a certified thermometer and Assman psychrometer, annually.

Certifications for the thermometer and Assman psychrometer can be found in the laboratory managers master lab file. Equilibration and weighing conditions will be noted on the Filter Weight Data Sheets or in a laboratory logbook.

INITIAL WEIGHING PROCEDURES

Several clean (non-exposed) filters will be processed at one time. Clean filters must not be folded or creased prior to weighing or use. Before weighing the first filter, the laboratory technician will check the previous 24-hour equilibration conditions as recorded by a hygrothermograph. If the equilibration conditions for the previous 24 hours do not meet the recommended EPA conditioning guidelines stated above, NO weighings will be performed. Weighings will be conducted when the EPA recommended equilibration conditions are satisfied.

Filters will be weighed on an analytical balance with a minimum resolution of 0.1 mg and a precision of 0.5 mg. The initial weighing procedures are as follows:

1) Zero the balance according to manufacturer instructions. This is accomplished by taking the filter holder out of the balance, pressing the TARE button and then pressing the CAL button. If the balance is functioning properly, two "C's" will appear. If the balance has malfunctioned, a "CE" will appear. If a "CE" appears, report the problem to the laboratory manager immediately. No filter weighings will be performed until the problem is resolved.

   Record that a zero and calibration check have been performed on the Filter Weight Data Sheet. These zero and calibration balance checks will be performed and documented after every 15 to 20 weighings.

2) If the previous balance check was successful, perform a QC "Standard Weight" check on the balance. This is accomplished by taking the ASTM Class "1" 3 and 5 gram weights and weighing them individually. If the actual and measured values differ by

more than ± 0.5 mg (.0005 g), the values should be reported to the laboratory manager immediately before proceeding. If the actual and measured values are within ± 0.5 mg, each filter can be weighed to the nearest milligram. The results of the "Standard Weight" check are noted on the Filter Weight Data Sheets.

3) Each filter will be weighed to the nearest 0.1 mg (.0001 g). The technician will weigh each filter within 30 seconds after removing it from the equilibration chamber.

NOTE: Be careful when loading and unloading the balance. The corners and edges of the filter should not bump against the balance glass because the filter may tear or filter material may be lost.

4) The technician will record date, time, weighing conditions, filter identification number, and tare weight of each filter on the Filter Weight Data Sheet - Tare, in black, indelible ink. These Filter Weight Data Sheets are contained in a bound volume in the filter laboratory and are presented in this SOP as Exhibit 1.

5) On each day in which filter weighing occurred, an independent operator will reweigh at least 10% but not less than 2 of the filters weighed. The independent operator will perform zero and calibration checks and Standard Weight checks prior to weighing. The independent operators QC weights will be checked against the original weight values. For tare weights, the QC weights should be within ± 2.8 mg of the original values. If the weights are not within ± 2.8 mg, the entire batch of filters weighed on that day will be reweighed. All weighing results including QC weights will be reviewed by the laboratory manager before filter shipment.

POST-SAMPLING DOCUMENTATION AND FILTER INSPECTION

Upon receipt of the exposed filters from the field, the laboratory technician will perform the following procedures:

1) Record the receipt of the filters by signing the Chain- of-Custody Form (Exhibit 2).

2) Record the receipt of the filters on the Hivol Filter Inventory Data Sheet (Exhibit 3). The technician will also review the Data Summary/Calculation Sheet and record filter numbers, their associated sampler id. and date sample exposed on the Hivol Filter Inventory Data Sheet.

3) The technician will examine the Data Summary/Calculation Sheet (Exhibit 4) to determine whether all data needed to validate the sample and to calculate mass concentration are provided. The information specifically reviewed includes average flow rate, ambient temperature and pressure, and elapsed time.

4) Remove the exposed filter in its protective folder from the zip-lock bag and examine the glassine/manilla folder and filter to see if sample material has become dislodged.

If sample material has been dislodged from the filter, recover as much as possible by brushing the material in the folder onto the filter using a soft, camel's hair brush.

5) If insects are embedded in the sample deposit, remove the insects with Teflon-tipped tweezers. Be careful not to disturb the sample deposit if possible. If >10 insects are observed, refer the sample to the laboratory manager for a decision to accept or reject the sample.

FINAL WEIGHING PROCEDURES

1) Place the exposed filters in the equilibration environment and allow the filters to equilibrate according to the filter equilibration procedure discussed above.

2) Repeat steps 1-3 as described in the initial weighing procedures.

3) Record date, time, weighing conditions, filter identification number, and final weight of each filter on the Filter Weight Data Sheet - Final, in black, indelible ink. These Filter Weight Data Sheets are contained in the a bound volume in the filter laboratory and are presented in this SOP as Exhibit 5.

4) On each day in which filter weighing occurred, an independent operator will reweigh at least 10% but not less than 2 of the filters weighed. The independent operator will perform zero and calibration checks and Standard Weight checks prior to weighing. The independent operators QC weights will be checked against the original final weight values. For final weights, the QC weights should be within $\pm$ 5.0 mg of the original final weight values. If the weights are not within $\pm$ 5.0 mg, notify the laboratory manager and the entire batch of filters weighed on that day may be reweighed. All weighing results including QC weights will be reviewed by the laboratory manager.

5) If the filter does not require further analysis, place the filter back in the manilla folder and zip-lock bag and archive the filter in numerical order, by project in the sample custody room.

NET MASS DETERMINATION

To determine Net Mass, subtract the tare weight from the final weight on the Data Summary/Calculation Sheet. In addition, enter tare weight and final weight information in LOTUS 1-2-3 spreadsheet set up for each project. Check results from Data Summary/Calculation Sheet against the results from 1-2-3 spreadsheet. A final QA check of all calculations will be performed by the Laboratory manager.

PM_{10} AND/OR TSP CALCULATION

To accurately report total PM_{10} and/or TSP concentration data, the total volume of air needs to be calculated and converted to EPA standard conditions. EPA standard conditions are 25°C (298 K) and 760 mm Hg (101 kPa). The procedure to calculate PM_{10} or TSP concentrations is outlined below:

1) Calculate the average flow rate corrected to EPA Standard Conditions:

$$Qstd = Qa\ (Pav/Pstd)(Tstd/Tav)$$

2) Calculate the total standard volume of air sampled:

$$Vstd = (Qstd)(t)$$

3) Calculate total PM_{10} and TSP concentrations in micrograms per cubic meter ($\mu g/m^3$) on the Data Summary/Calculation Sheets:

$$PM_{10} = (10^6)(W_{final} - W_{tare})/Vstd$$
$$TSP = (10^6)(W_{final} - W_{tare})/Vstd$$

Where:

PM_{10} = PM_{10} mass concentration, $\mu g/m^3$
TSP = TSP mass concentration, $\mu g/m^3$
10^6 = conversion factor
W_{final} = final weight, grams
W_{tare} = tare weight, grams
Vstd = total sample volume, m^3

4) Enter all flow, time, and weight information into LOTUS 1-2-3 spreadsheet. Compare PM_{10} and TSP results with results derived on Data Summary/Calculation Sheets. A final QA check of all calculations will be performed by the laboratory manager prior to submitting concentration data to the client.

QUALITY ASSURANCE RECORDS

The laboratory technician will file all laboratory and field paper work, by project, in 3-ring binders in the laboratory managers office. This paper work includes chain-of-custody forms, Hivol Filter Inventory Data Sheets, xerox copies of the Filter Weight Data Sheets, Data Summary/Calculation Sheets, xerox copies of transmittal correspondence and correspondence received. The exposed filters are to be stored in the sample custody room for a minimum of 2 years until transmittal to the client or for further analysis.

PROJECT #_____ OPERATOR(S)_____

EQUILIBRATION START DATE/TIME_____ TEMP_____ RH_____

EQUILIBRATION END DATE/TIME_____ TEMP_____ RH_____

BALANCE CHECK: 3 GRAMS_____ 5 GRAMS_____ ZERO CHECK? YES NO

QC DATE/TIME_____ TEMP_____ RH_____

BALANCE CHECK: 3 GRAMS_____ 5 GRAMS_____ ZERO CHECK? YES NO

FILTER #	INITALS	TARE WEIGHT	QC INITALS	QC WEIGHT

PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: _____

Date: _____

Filter I.D. _____

Prepared by: _____ Date: _____
Title:

Relinquished by: _____ Date: _____
Title:

Received by: _____ Date: _____
Title:

Relinquished by: _____ Date: _____
Title:

Received by: _____ Date: _____
Title:

Relinquished by: _____ Date: _____
Title:

Received by: _____ Date: _____
Title:

Relinquished by: _____ Date: _____
Title:

Received by: _____ Date: _____
Title:

Relinquished by: _____ Date: _____
Title:

Received by: _____ Date: _____
Title:

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EXHIBIT 2

PROJECT # _____

FILTER #	SAMPLER #	DATE EXPOSED	COMMENTS

EXHIBIT 3

Project _____ Filter No. _____ Sampler ID _____

Part A. Field Data (Vol. of air sampled)

Site _____ Date, on _____ off _____

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_{ex} in. H_2O
Stop			
Start			
Total, Hrs.			
Mean			

Sample Period:

Tav (Average Temp.) _____ °C _____ °K

Pav (Average Barom. Press.) _____ mmHg

Sampler Calibration Relationship:

m = _____

b = _____

r = _____

Calib. Date: _____

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_{ex} (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time _____ min

$\overline{Qa}$ = _____ m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

_____

_____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final			
Tare			
Net (Wn)			

Part C. PM_{10} Calculations:

$\overline{Qstd} = \overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ _____ std m^3/min Vstd _____ std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration _____ μg/std m^3

Performed by: _____ Checked by: _____

PROJECT #_____ OPERATOR(S)_____

EQUILIBRATION START DATE/TIME_____/_____TEMP_____RH_____

EQUILIBRATION END DATE/TIME_____/_____TEMP_____RH_____

BALANCE CHECK: 3 GRAMS_____5 GRAMS_____ZERO CHECK? YES NO

QC DATE/TIME_____/_____TEMP_____RH_____

BALANCE CHECK: 3 GRAMS_____5 GRAMS_____ZERO CHECK? YES NO

FILTER #	INITALS	FINAL WEIGHT	QC INITALS	QC WEIGHT

FILTER WEIGHT DATA SHEET – TARE

PROJECT # 4142 OPERATOR(S) TomW.

EQUILIBRATION START DATE/TIME 9/21/93 0830 TEMP 24.0 RH 28

EQUILIBRATION END DATE/TIME 9/21/93 0830 TEMP 23.0 RH 28

BALANCE CHECK: 3 GRAMS 3.0002 5 GRAMS 5.0002 ZERO CHECK? YES NO

QC DATE/TIME 9/21/93 TEMP 24.4 RH 29.3

BALANCE CHECK: 3 GRAMS 3.0001 5 GRAMS 5.0002 ZERO CHECK? YES NO

FILTER #	INITALS	TARE WEIGHT	QC INITALS	QC WEIGHT
14201	TGW	3.6564	LEC	3.6561
14202		3.6470		
14203		3.6748		
14204		3.6480	LEC	3.6480
14205		3.6471		
14206		3.6376		
14207		3.6518	LEC	3.6319
14208		3.6396		
14209		3.6449		
14210		3.6509	LEC	3.6511
14211		3.6489		
14212		3.6559		
14213		3.6554	LEC	3.6550
14214		3.6623		
14215		3.6618		
14216		3.6575	LEC	3.6579
14217		3.6559		
14218		3.6497		
14219		3.6533		
14220		3.6459	LEC	3.6459
14221		3.6490		
14222		3.6553		
14223		3.6553		
14224		3.6546	LEC	3.6543
14225		3.6553		
14226		3.6543		
14227		3.6611		
14228		3.6658	LEC	3.6665
14229		3.6557		
14230		3.6569		
14231		3.6471	LEC	3.6477
14232		3.6512		
14233		3.6545		
14234		3.6555		
14235		3.6620	LEC	3.6625
14236		3.6459		
14237		3.6512		
14238		3.6456		
14239		3.6497		

PROJECT # A142 OPERATOR(S) TomW

EQUILIBRATION START DATE/TIME 9/17/93 1400 TEMP 24.4 RH 35.6

EQUILIBRATION END DATE/TIME 9/21/93 0830 TEMP 23.0 RH 28.4

BALANCE CHECK: 3 GRAMS 3.0002 5 GRAMS 5.0002 ZERO CHECK? (YES) NO

QC DATE/TIME 9/21/93 TEMP 24.4 RH 29.3

BALANCE CHECK: 3 GRAMS 3.0001 5 GRAMS 5.0002 ZERO CHECK? (YES) NO

FILTER #	INITALS	TARE WEIGHT	QC INITALS	QC WEIGHT
14240	TGW	3.6550		
14241		3.6547		
14242		3.6326	LEC	3.6333
14245		3.6562		
14244		3.6667		
14245		3.6673	LEC	3.6674
14246		3.6596		
14247		3.6526		
14248		3.6505	LEC	3.6504
14249		3.6394		
14250		3.6520		
14251		3.6479		
14252		3.6533		
14253		3.6429	LEC	3.6432
14254		3.6367		
14255		3.6381		
14256		3.6363	LEC	3.6364
14257		3.6494		
14258		3.6367		
14259		3.6465		
14260		3.6504	LEC	3.6504

EQUILIBRATION START DATE/TIME 10/25/93 1615 TEMP 23.8 RH 31

EQUILIBRATION END DATE/TIME 10/28/93 1630 TEMP 21.7 RH 26.2

BALANCE CHECK: 3 GRAMS 2.9999 5 GRAMS 5.0002 ZERO CHECK? (YES) NO

QC DATE/TIME 10/28/93 1650 TEMP 21.8 RH 24.3

BALANCE CHECK: 3 GRAMS 3.0001 5 GRAMS 5.0003 ZERO CHECK? (YES) NO

FILTER #	INITALS	TARE FINAL WEIGHT	QC INITALS	QC WEIGHT
14201	LEC	3.6685	TGW	3.6685
14202	"	3.6604		
14203				
14204		3.6616		
14205		3.5794	TGW	3.5795
14207		3.4723		
14208		3.6471		
14209		3.6508	TGW	3.6510
14210	↓	3.6586		

PROJECT # H 17C OPERATOR(S) TOM W.

EQUILIBRATION START DATE/TIME 11/12/93 1530 TEMP 22.0 RH 23.6

EQUILIBRATION END DATE/TIME 11/15/93 1000 TEMP 22.2 RH 17.6

BALANCE CHECK: 3 GRAMS 3.0001 5 GRAMS 5.0002 ZERO CHECK? (YES) NO

QC DATE/TIME 11/15/93 1330 1 TEMP 23.2 RH 19.6

BALANCE CHECK: 3 GRAMS 3.0001 5 GRAMS 5.0002 ZERO CHECK? (YES) NO

FILTER #	INITALS	~~TARE~~ FINAL WEIGHT	QC INITALS	QC WEIGHT
14211	TGW	3.6988		
14212		3.7089	LEC	3.7086
14213		3.6970		
14214		3.7108	LEC	3.7099
14215		3.8116		
14216		3.7569	LEC	3.7547
14217		3.7336		
14218		3.7162	LEC	3.7156
14219		3.8898914 *	LEC	3.8825 *
14220		3.9209	LEC	3.9162 *
14221		3.8053	LEC	3.8042
14222		3.8245		
14223		3.7621		
14224		3.7517	LEC	3.7511
14225		3.7143		
14226		3.7293	LEC	3.7283
14227		3.6618		
14228		3.6666	LEC	3.6663
14229		3.6590		
14230		3.6560	LEC	3.6559

* Extremely dusty / dusty - particles might have been lost in the weighing process

EQUILIBRATION START DATE/TIME 12/10/93 | 1075 TEMP 23 RH 20.1

EQUILIBRATION END DATE/TIME 12/15/93 | 23 0940 TEMP 22.0 RH 19.3

BALANCE CHECK: 3 GRAMS 3.0000 5 GRAMS 5.0001 ZERO CHECK? (YES) NO

QC DATE/TIME 12/15/93 | 10.45 TEMP 21.8 RH 19.3

BALANCE CHECK: 3 GRAMS 3.0002 5 GRAMS 5.0004 ZERO CHECK? (YES) NO

Final

FILTER #	INITALS	~~TARE~~ WEIGHT	QC INITALS	QC WEIGHT
14231	TOW	3.7154	LEC	3.7152
14233		3.7596		
14234		3.7483		
14235		3.7609	LEC	3.7610
14236		3.7136		
14237		3.7116		
14238		3.7130		
14239		3.6849	LEC	3.6847
14240		3.7013		
14241		3.6947		
14242		3.6815	LEC	3.6818
14243		3.6762		
14244		3.7120		
14245		3.7029		
14246		3.6810	LEC	3.6813
14247		3.6530		
14248		3.6500		
14249		3.6394		
14250		3.6528	LEC	3.6541

APPENDIX E

Chain-of-Custody Forms

PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: SF-2

Date: 10/5 - 10/9

Filter I.D. 14201

Prepared by: NAWC LAB LEC Date: 10/01/93

Title: NAWC LAB LEC

Relinquished by: _____ Date: 10/01/93

Title:

Received by: Todd Lurcott Date: 10/1/93

Title:

Relinquished by: Todd Lurcott Date: 10/18/93

Title:

Received by: [illegible] Date: 10/.../93

Title:

Relinquished by: _____ Date: _____

Title:

Received by: _____ Date: _____

Title:

Relinquished by: _____ Date: _____

Title:

Received by: _____ Date: _____

Title:

Relinquished by: _____ Date: _____

Title:

Received by: _____ Date: _____

Title:

NAWC

NORTH AMERICAN WEATHER CONSULTANTS · 1293 West 2300 South, Salt Lake City, Utah 84119 · (801)972-3300

PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-1

Date: 10/5 - 10/9

Filter I.D. 14202

Prepared by:	NAWC LAB LEC	**Date:**	10/01/93
	Title:		
Relinquished by:	NAWC LAB LEC	**Date:**	10/01/93
	Title:		
Received by:	Tom Wescott	**Date:**	10/6/93
	Title:		
Relinquished by:	Tom Wescott	**Date:**	10/6/93
	Title:		
Received by:	L. Cox	**Date:**	10/8/93
	Title:		
Relinquished by:		**Date:**	
	Title:		
Received by:		**Date:**	
	Title:		
Relinquished by:		**Date:**	
	Title:		
Received by:		**Date:**	
	Title:		
Relinquished by:		**Date:**	
	Title:		
Received by:		**Date:**	
	Title:		

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: [illegible]

Date: 10/5-10/9

Filter I.D. 14203

Prepared by:	NAWC LAB LEC	Date:	10/01/93
	Title:		
Relinquished by:	NAWC LAB LEC	Date:	10/01/93
	Title:		
Received by:	Tom Wescott	Date:	10/1/93
	Title:		
Relinquished by:	Tom Wescott	Date:	10/18/93
	Title:		
Received by:	[illegible]	Date:	10/18/93
	Title:		
Relinquished by:		Date:	
	Title:		
Received by:		Date:	
	Title:		
Relinquished by:		Date:	
	Title:		
Received by:		Date:	
	Title:		
Relinquished by:		Date:	
	Title:		
Received by:		Date:	
	Title:		

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-3

Date: 10/5 - 10/9

Filter I.D. 14204

Prepared by:	NAVC LAB LEC	Date:	10/01/93
Relinquished by:	NAVC LAB LEC Title:	Date:	10/01/93
Received by:	Todd Wescott Title:	Date:	10/1/93
Relinquished by:	Todd Wescott Title:	Date:	10/8/93
Received by:	[illegible] Title:	Date:	10/08/93
Relinquished by:	Title:	Date:	
Received by:	Title:	Date:	
Relinquished by:	Title:	Date:	
Received by:	Title:	Date:	
Relinquished by:	Title:	Date:	
Received by:	Title:	Date:	

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-5

Date: 10/8 - 10/9

Filter I.D. 14205

Prepared by:	NAWC LAB LEC	Date: 10/01/93
Relinquished by:	NAWC LAB LEC Title:	Date: 10/01/93
Received by:	Tod Wescott Title:	Date: 10/1/93
Relinquished by:	Tod Wescott Title:	Date: 10/18/93
Received by:	[illegible] Title:	Date: 10/18/93
Relinquished by:	Title:	Date:
Received by:	Title:	Date:
Relinquished by:	Title:	Date:
Received by:	Title:	Date:
Relinquished by:	Title:	Date:
Received by:	Title:	Date:

NORTH AMERICAN WEATHER CONSULTANTS - 1295 West 2200 South, Salt Lake City, Utah 84119 - (801)972-1500

PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-1

Date: 10/15 - 10/16

Filter I.D. 14207

Prepared by:	NAWC LAB LEC Title: NAWC LAB LEC	**Date:**	10/01/93 10/01/93
Relinquished by:	Title:	**Date:**	
Received by:	Todd Wescott Title:	**Date:**	10/21/93
Relinquished by:	Todd Wescott Title:	**Date:**	10/22/93
Received by:	Linda Cragen Title:	**Date:**	10/22/93
Relinquished by:	Title:	**Date:**	
Received by:	Title:	**Date:**	
Relinquished by:	Title:	**Date:**	
Received by:	Title:	**Date:**	
Relinquished by:	Title:	**Date:**	
Received by:	Title:	**Date:**	

PM$_{10}$ FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-3

Date: 10/15 - 10/16

Filter I.D. 14208

NAWC LAB LEC

Prepared by:	NAWC LAB LEC	Title	Date: 10/01/93
Relinquished by:		Title:	Date: 10/01/93
Received by:	Tom Wacont	Title:	Date: 10/19/93
Relinquished by:	Tom Wacont	Title:	Date: 10/22/93
Received by:	Linda Conger	Title:	Date: 10/22/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-5

Date: 10/15 - 10/16

Filter I.D. 14209

Prepared by:	NAWC LAB LEC	Date:	10/01/93
	Title NAWC LAB LEC		
Relinquished by:		Date:	10/01/93
	Title:		
Received by:	Tom Wescott	Date:	10/1/93
	Title:		
Relinquished by:	Tom Wescott	Date:	10/7/93
	Title:		
Received by:	[signature]	Date:	10/22/93
	Title:		
Relinquished by:		Date:	
	Title:		
Received by:		Date:	
	Title:		
Relinquished by:		Date:	
	Title:		
Received by:		Date:	
	Title:		
Relinquished by:		Date:	
	Title:		
Received by:		Date:	
	Title:		

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-2

Date: 10/5 - 10/6

Filter I.D. 14210

Prepared by: NAWC LAB LEC — Date: 10/01/93

Title: NAWC LAB LEC

Relinquished by: _____ — Date: 10/01/93

Title:

Received by: Todd Wescott — Date: 10/21/93

Title:

Relinquished by: Todd Wescott — Date: 10/22/93

Title:

Received by: Linda Chinen — Date: 10/22/93

Title:

Relinquished by: _____ — Date: _____

Title:

Received by: _____ — Date: _____

Title:

Relinquished by: _____ — Date: _____

Title:

Received by: _____ — Date: _____

Title:

Relinquished by: _____ — Date: _____

Title:

Received by: _____ — Date: _____

Title:

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-1

Date: 10/21 - 10/22

Filter I.D. 14211

Prepared by:	NAWC LAB LEC	Title: NAWC LAB LEC	Date: 10/01/93
Relinquished by:		Title:	Date: 10/01/93
Received by:	[signature]	Title:	Date: 10/1/93
Relinquished by:	[signature]	Title:	Date: 11/4/93
Received by:	[signature]	Title:	Date: 11/8/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

NAWC

NORTH AMERICAN WEATHER CONSULTANTS - 1707 West 2200 South, Salt Lake City, Utah 84119 - (801)972-3300

PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-3

Date: 10/21 - 10/22

Filter I.D. 14212

Prepared by:	NAWC LAB LEC	Date:	10/01/93
Title:	NAWC LAB LEC		10/01/93
Relinquished by:		Date:	
Title:			
Received by:	Tom Wescott	Date:	10/1/93
Title:			
Relinquished by:	Tom Wescott	Date:	10/4/93
Title:			
Received by:	[illegible]	Date:	11/8/93
Title:			
Relinquished by:		Date:	
Title:			
Received by:		Date:	
Title:			
Relinquished by:		Date:	
Title:			
Received by:		Date:	
Title:			
Relinquished by:		Date:	
Title:			
Received by:		Date:	
Title:			

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-5

Date: 10/1 - 10/2

Filter I.D. 14213

Prepared by: NAWC LAB LEC — Date: 10/01/93

Title: NAWC LAB LEC

Relinquished by: _____ — Date: 10/01/93

Title:

Received by: Tom Wood — Date: 10/1/93

Title:

Relinquished by: Tom Wood — Date: 10/4/93

Title:

Received by: Linda Logan — Date: 10/8/93

Title:

Relinquished by: _____ — Date: _____

Title:

Received by: _____ — Date: _____

Title:

Relinquished by: _____ — Date: _____

Title:

Received by: _____ — Date: _____

Title:

Relinquished by: _____ — Date: _____

Title:

Received by: _____ — Date: _____

Title:

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-2

Date: 10/21 - 10/22

Filter I.D. 14214

Prepared by:	NAWC LAB LEC	Date:	10/01/93
Title:	NAWC LAB LEC		
Relinquished by:		Date:	10/01/93
Title:			
Received by:	Tom Wilcoxon	Date:	10/4/93 1600
Title:			
Relinquished by:	Tom Wilcoxon	Date:	10/4/93
Title:			
Received by:	[illegible]	Date:	10/5/93
Title:			
Relinquished by:		Date:	
Title:			
Received by:		Date:	
Title:			
Relinquished by:		Date:	
Title:			
Received by:		Date:	
Title:			
Relinquished by:		Date:	
Title:			
Received by:		Date:	
Title:			

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-2

Date: 10/27 - 10/28

Filter I.D. 14215

Prepared by:	NAWC LAB LEC Title:	**Date:**	10/01/93
Relinquished by:	NAWC LAB LEC Title:	**Date:**	10/01/93
Received by:	Todd Vincent Title:	**Date:**	10/1/93
Relinquished by:	Todd Vincent Title:	**Date:**	10/4/93
Received by:	Jan Curry Title:	**Date:**	11/8/93
Relinquished by:	Title:	**Date:**	
Received by:	Title:	**Date:**	
Relinquished by:	Title:	**Date:**	
Received by:	Title:	**Date:**	
Relinquished by:	Title:	**Date:**	
Received by:	Title:	**Date:**	

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-5

Date: 10/27 - 10/28

Filter I.D. 14216

Prepared by:	NAWC LAB LEC	**Title:**	**Date:** 10/01/93
Relinquished by:	NAWC LAB LEC	**Title:**	**Date:** 10/01/93
Received by:	[signature]	**Title:**	**Date:** 10/6/93
Relinquished by:	[signature]	**Title:**	**Date:** 10/4/93
Received by:	[signature]	**Title:**	**Date:** 11/8/93
Relinquished by:		**Title:**	**Date:**
Received by:		**Title:**	**Date:**
Relinquished by:		**Title:**	**Date:**
Received by:		**Title:**	**Date:**
Relinquished by:		**Title:**	**Date:**
Received by:		**Title:**	**Date:**

PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-3

Date: 10/17 - 10/18

Filter I.D. 14217

Prepared by: NAWC LAB LEC — **Date:** 10/01/93

Title: NAWC LAB LEC

Relinquished by: _____ — **Date:** 10/01/93

Title:

Received by: Tom Wescott — **Date:** 10/19/93

Title:

Relinquished by: Tom Wescott — **Date:** 11/4/93

Title:

Received by: Lisa Cruz — **Date:** 11/8/93

Title:

Relinquished by: _____ — **Date:** _____

Title:

Received by: _____ — **Date:** _____

Title:

Relinquished by: _____ — **Date:** _____

Title:

Received by: _____ — **Date:** _____

Title:

Relinquished by: _____ — **Date:** _____

Title:

Received by: _____ — **Date:** _____

Title:

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-1

Date: 10/27 - 10/28

Filter I.D. 14218

Prepared by:	NAWC LAB LEC	Title:	Date: 10/01/93
Relinquished by:	NAWC LAB LEC	Title:	Date: 10/01/93
Received by:	Tom Wescott	Title:	Date: 10/1/93 ~~11/4/93~~
Relinquished by:	Tom Wescott	Title:	Date: 11/4/93
Received by:	[signature]	Title:	Date: 11/5/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: ~~16W #1~~ TSP-2

Date: ~~10/27~~ 11/2-11/3

Filter I.D. 14219

Prepared by: NAVC LAB LEC — Date: 10/01/93

Title: NAVC LAB LEC

Relinquished by: _____ — Date: 10/01/93

Title:

Received by: Tom Wilcoxon — Date: 10/1/93

Title:

Relinquished by: Tom Wilcoxon — Date: 11/8/93

Title:

Received by: L. Cox — Date: 11/8/93

Title:

Relinquished by: _____ — Date: _____

Title:

Received by: _____ — Date: _____

Title:

Relinquished by: _____ — Date: _____

Title:

Received by: _____ — Date: _____

Title:

Relinquished by: _____ — Date: _____

Title:

Received by: _____ — Date: _____

Title:

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-5

Date: 11/2 - 11/3

Filter I.D. 14220

Prepared by:	NAWC LAB LEC Title:	Date:	10/01/93
Relinquished by:	NAWC LAB LEC Title:	Date:	10/01/93
Received by:	Tom Wilcoxon Title:	Date:	10/1/93
Relinquished by:	Tom Wilcoxon Title:	Date:	11/8/93
Received by:	Linda Conger Title:	Date:	11/8/93
Relinquished by:	Title:	Date:	
Received by:	Title:	Date:	
Relinquished by:	Title:	Date:	
Received by:	Title:	Date:	
Relinquished by:	Title:	Date:	
Received by:	Title:	Date:	

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-1

Date: 11/7-11/3

Filter I.D. 14221

Prepared by: NAWC LAB LEC Date: 10/01/93

Title: NAWC LAB LEC

Relinquished by: _____ Date: 10/01/93

Title:

Received by: Todd Wenzel Date: 10/1/93

Title:

Relinquished by: Todd Wenzel Date: 11/8/93

Title:

Received by: Luc Cuyler Date: 11/8/93

Title:

Relinquished by: _____ Date: _____

Title:

Received by: _____ Date: _____

Title:

Relinquished by: _____ Date: _____

Title:

Received by: _____ Date: _____

Title:

Relinquished by: _____ Date: _____

Title:

Received by: _____ Date: _____

Title:

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: ISP-3

Date: 11/2 - 11/3

Filter I.D. 14222

Prepared by: NAWC LAB LEC Title: ~~NAWC LAB LEC~~ Date: 10/01/93

Relinquished by: ✓ Title: Date: 10/01/93

Received by: Tony Wiscomb Title: Date: 10/1/93

Relinquished by: Tony Wiscomb Title: Date: 11/5/93

Received by: Linda Cruz Title: Date: 11/5/93

Relinquished by: Title: Date:

Received by: Title: Date:

Relinquished by: Title: Date:

Received by: Title: Date:

Relinquished by: Title: Date:

Received by: Title: Date:

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-2

Date: 11/7 - 11/8

Filter I.D. 14223

Prepared by:	NAWC LAB LEC	Title:	Date: 10/01/93
Relinquished by:	NAWC LAB LEC	Title:	Date: 10/01/93
Received by:	Tom Wescott	Title:	Date: 10/1/93
Relinquished by:	Tom Wescott	Title:	Date: 11/15/93
Received by:	Linda Cooper	Title:	Date: 11/15/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-5

Date: 11/7 - 11/8

Filter I.D. 14224

Prepared by:	NAWC LAB LEC	Title:	Date: 10/01/93
Relinquished by:	NAWC LAB LEC	Title:	Date: 10/01/93
Received by:	Tom Wescott	Title:	Date: 10/1/93
Relinquished by:	Tom Wescott	Title:	Date: 11/15-93
Received by:	Lisa Cmiel	Title:	Date: 11/15/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-1

Date: 11/8-11/9

Filter I.D. 14225

Prepared by:	NAWC LAB LEC	Title:	Date: 10/01/93
Relinquished by:	NAWC LAB LEC	Title:	Date: 10/01/93
Received by:	Tom Wiscombe	Title:	Date: 10/1/93
Relinquished by:	Tom Wiscombe	Title:	Date: 11/15/93
Received by:	Linda Cannon	Title:	Date: 11/15/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-3

Date: 11/8-11/9

Filter I.D. 14226

Prepared by:	NAWC LAB LEC	Date:	
Title:	NAWC LAB LEC		
Relinquished by:		Date:	
Title:			
Received by:	Tom Wunsch	Date:	10/1/93
Title:			
Relinquished by:	Tom Wunsch	Date:	11/15/93
Title:			
Received by:	Linda Cruz	Date:	11/15/93
Title:			
Relinquished by:		Date:	
Title:			
Received by:		Date:	
Title:			
Relinquished by:		Date:	
Title:			
Received by:		Date:	
Title:			
Relinquished by:		Date:	
Title:			
Received by:		Date:	
Title:			

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-2

Date: 11/11 - 11/12

Filter I.D. 14227

Prepared by:	NAWC LAB LEC Title:	Date:	10/01/93
Relinquished by:	NAWC LAB LEC Title:	Date:	10/01/93
Received by:	Tom Wescott Title:	Date:	10/1/93
Relinquished by:	Tom Wescott Title:	Date:	~~10/1/93~~ 10/15/93 Tom
Received by:	[signature] Title:	Date:	11/15/93
Relinquished by:	Title:	Date:	
Received by:	Title:	Date:	
Relinquished by:	Title:	Date:	
Received by:	Title:	Date:	
Relinquished by:	Title:	Date:	
Received by:	Title:	Date:	

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-5

Date: 11/1-11/2

Filter I.D. 14228

Prepared by:	NAWC LAB LEC	Title:	Date:
Relinquished by:	NAWC LAB LEC	Title:	Date:
Received by:	Todd Wiscombe	Title:	Date: 10/1/93
Relinquished by:	Todd Wiscombe	Title:	Date: 11/15/93
Received by:	Linda Cannon	Title:	Date: 11/15/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

NAWC

NORTH AMERICAN WEATHER CONSULTANTS - 1293 West 2200 South, Salt Lake City, Utah 84119 - (801)972-2500

PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-1

Date: 11/11 - 11/12

Filter I.D. 14229

Prepared by:	NAWC LAB LEC	Title:	**Date:**
Relinquished by:	NAWC LAB LEC	Title:	**Date:**
Received by:	Tom Wimmer	Title:	**Date:** 10/11/93
Relinquished by:	Tom Wimmer	Title:	**Date:** 11/15/93
Received by:		Title:	**Date:** 11/15/93
Relinquished by:		Title:	**Date:**
Received by:		Title:	**Date:**
Relinquished by:		Title:	**Date:**
Received by:		Title:	**Date:**
Relinquished by:		Title:	**Date:**
Received by:		Title:	**Date:**

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-3

Date: 11/11 - 11/12

Filter I.D. 14230

Prepared by:	NAWC LAB LEC Title:	Date:	[illegible] 93
Relinquished by:	NAWC LAB LEC Title:	Date:	
Received by:	[signature] Title:	Date:	10/1/93
Relinquished by:	[signature] Title:	Date:	10/15/93
Received by:	[signature] Title:	Date:	10/15/93
Relinquished by:	Title:	Date:	
Received by:	Title:	Date:	
Relinquished by:	Title:	Date:	
Received by:	Title:	Date:	
Relinquished by:	Title:	Date:	
Received by:	Title:	Date:	

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-2

Date: 11/14-11/15

Filter I.D. 14231

Prepared by:	NAWC LAB LEC Title:	**Date:**	10/01/93
Relinquished by:	NAWC LAB LEC Title:	**Date:**	10/01/93
Received by:	Todd Uncork Title:	**Date:**	10/1/93
Relinquished by:	Todd Uncork Title:	**Date:**	12/16/93
Received by:	L. C. Title:	**Date:**	12-15-93
Relinquished by:	Title:	**Date:**	
Received by:	Title:	**Date:**	
Relinquished by:	Title:	**Date:**	
Received by:	Title:	**Date:**	
Relinquished by:	Title:	**Date:**	
Received by:	Title:	**Date:**	

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-5

Date: 11/14 - 11/15

Filter I.D. 14233

Prepared by:	NAWC LAB LEC	Date:	10/31/93
Title:	NAWC LAB LEC		
Relinquished by:		Date:	10/31/93
Title:			
Received by:	Todd Wescott	Date:	10/1/93
Title:			
Relinquished by:	Todd Wescott	Date:	12/10/93
Title:			
Received by:	Linda Conger	Date:	12/15/93
Title:			
Relinquished by:		Date:	
Title:			
Received by:		Date:	
Title:			
Relinquished by:		Date:	
Title:			
Received by:		Date:	
Title:			
Relinquished by:		Date:	
Title:			
Received by:		Date:	
Title:			

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-1

Date: 11/14 - 11/15

Filter I.D. 14234

Prepared by: NAWC LAB LEC — **Date:** 10/31/93

Relinquished by: NAWC LAB LEC — **Date:** 10/31/93

Title:

Received by: [signature] — **Date:** 10/6/93

Title:

Relinquished by: [signature] — **Date:** 12/6/93

Title:

Received by: [signature] — **Date:** 12/5/93

Title:

Relinquished by: _____ — **Date:** _____

Title:

Received by: _____ — **Date:** _____

Title:

Relinquished by: _____ — **Date:** _____

Title:

Received by: _____ — **Date:** _____

Title:

Relinquished by: _____ — **Date:** _____

Title:

Received by: _____ — **Date:** _____

Title:

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-J

Date: 11/14-11/15

Filter I.D. 14235

Prepared by:	NAWC LAB LEC	Title:	Date:
Relinquished by:	NAWC LAB LEC	Title:	Date:
Received by:	[signature]	Title:	Date: 10/1/93
Relinquished by:	[signature]	Title:	Date: 12/10/93
Received by:	[signature]	Title:	Date: 12/15/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-55

Date: ~~11/4 - 11/5~~ 11/4 - 11/5

Filter I.D. 14236

Prepared by:	NAWC LAB LEC	Title:	**Date:**
Relinquished by:	NAWC LAB LEC	Title:	**Date:**
Received by:	Todd Wescott	Title:	**Date:** 10/19/93
Relinquished by:	Todd Wescott	Title:	**Date:** 12/10/93
Received by:	Linda Conger	Title:	**Date:** 12/15/93
Relinquished by:		Title:	**Date:**
Received by:		Title:	**Date:**
Relinquished by:		Title:	**Date:**
Received by:		Title:	**Date:**
Relinquished by:		Title:	**Date:**
Received by:		Title:	**Date:**

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-1

Date: 11/4C - 11/21

Filter I.D. 14237

Prepared by: NAWC LAB LEC Date: 10/01/93

Title: NAWC LAB LEC

Relinquished by: _____ Date: 10/01/93

Title:

Received by: [signature] Date: 10/1/93

Title:

Relinquished by: [signature] Date: 12/10/93

Title:

Received by: [signature] Date: 12/15/93

Title:

Relinquished by: _____ Date: _____

Title:

Received by: _____ Date: _____

Title:

Relinquished by: _____ Date: _____

Title:

Received by: _____ Date: _____

Title:

Relinquished by: _____ Date: _____

Title:

Received by: _____ Date: _____

Title:

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-3

Date: 11/20 - 11/21

Filter I.D. 14238

Prepared by: NAWC LAB LEC **Title:** **Date:**

Relinquished by: NAWC LAB LEC **Title:** **Date:**

Received by: Todd Wescott **Title:** **Date:** 10/1/93

Relinquished by: Todd Wescott **Title:** **Date:** 12/10/93

Received by: Lisa Lingo **Title:** **Date:** 12/15/93

Relinquished by: **Title:** **Date:**

Received by: **Title:** **Date:**

Relinquished by: **Title:** **Date:**

Received by: **Title:** **Date:**

Relinquished by: **Title:** **Date:**

Received by: **Title:** **Date:**

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-2

Date: ~~11/3-5~~ 11/27-11/23

Filter I.D. 14239

Prepared by:	NAWC LAB LEC	Title:	Date:
Relinquished by:	NAWC LAB LEC	Title:	Date:
Received by:	[signature]	Title:	Date: 10/1/93
Relinquished by:	[signature]	Title:	Date: 12/16/93
Received by:	[signature]	Title:	Date: 12/15/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-5

Date: 11/27 - 11/28

Filter I.D. 14240

Prepared by: NAWC LAB LEC — **Date:** 10/03

Title: NAWC LAB LEC

Relinquished by: _____ — **Date:** 10/03

Title:

Received by: Tom Wescott — **Date:** 10/6/95

Title:

Relinquished by: Tom Wescott — **Date:** 12/10/95

Title:

Received by: [signature] — **Date:** 12/15/95

Title:

Relinquished by: _____ — **Date:** _____

Title:

Received by: _____ — **Date:** _____

Title:

Relinquished by: _____ — **Date:** _____

Title:

Received by: _____ — **Date:** _____

Title:

Relinquished by: _____ — **Date:** _____

Title:

Received by: _____ — **Date:** _____

Title:

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-1

Date: 11/27-11/28

Filter I.D. 14241

Prepared by:	NAWC LAB LEC	Date:	illegible
Relinquished by:	NAWC LAB LEC	Date:	illegible
Received by:	Tom Wilmoth	Date:	12/1/93
Relinquished by:	Tom Wilmoth	Date:	12/10/93
Received by:	Linda Conyers	Date:	12/15/93
Relinquished by:		Date:	
Received by:		Date:	
Relinquished by:		Date:	
Received by:		Date:	
Relinquished by:		Date:	
Received by:		Date:	

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: ISP-3

Date: 11/27-12/5

Filter I.D. 14242

Prepared by:	NAWC LAB LEC	Title: NAWC LAB LEC	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date: 12/1/93
Relinquished by:		Title:	Date: 12/1/93
Received by:		Title:	Date: 12/5/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

NAWC

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-2

Date: 12/7-12/13

Filter I.D. 14243

Prepared by:	NAWC LAB LEC	Title:	Date:
Relinquished by:	NAWC LAB LEC	Title:	Date:
Received by:	Tom Ellwood	Title:	Date: 12/1/93
Relinquished by:	Tom Ellwood	Title:	Date: 12/10/93
Received by:	Jim Cain	Title:	Date: 12/15/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-5

Date: 12/11 - 12/13

Filter I.D. 14244

Prepared by:	NAWC LAB LEC	Title: NAWC LAB LEC	Date: 12/7/93
Relinquished by:		Title:	Date:
Received by:	Todd Lincoln	Title:	Date: 12/11/93
Relinquished by:	Todd Lincoln	Title:	Date: 12/13/93
Received by:	[illegible]	Title:	Date: 12/13/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-1

Date: 12/2-12/3

Filter I.D. 14245

Prepared by:	NAWC LAB LEC	Title:	Date:
Relinquished by:	NAWC LAB LEC	Title:	Date:
Received by:	[signature]	Title:	Date: 12/1/93
Relinquished by:	[signature]	Title:	Date: 12/1/93
Received by:	[signature]	Title:	Date: 12/3/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-3

Date: 12/7 -12/13

Filter I.D. 14246

Prepared by:	NAWC LAB LEC	Title:	**Date:**
Relinquished by:	NAWC LAB LEC	Title:	**Date:**
Received by:	Todd Linwood	Title:	**Date:** 12/14/93
Relinquished by:	Todd Linwood	Title:	**Date:** 12/10/93
Received by:	L. L. Cooper	Title:	**Date:** 12/15/93
Relinquished by:		Title:	**Date:**
Received by:		Title:	**Date:**
Relinquished by:		Title:	**Date:**
Received by:		Title:	**Date:**
Relinquished by:		Title:	**Date:**
Received by:		Title:	**Date:**

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-5

Date: 12/6 - 12/7

Filter I.D. 14247

Prepared by:	NAWC LAB LEC	Title:	Date:
Relinquished by:	NAWC LAB LEC	Title:	Date:
Received by:	Todd Wescott	Title:	Date: 12/10/93
Relinquished by:	Todd Wescott	Title:	Date: 12/10/93
Received by:	Jon Cayer	Title:	Date: 12/15/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-1

Date: 12/6-12/7

Filter I.D. 14248

Prepared by:	NAWC LAB LEC	Title:	Date:
Relinquished by:	NAWC LAB LEC	Title:	Date:
Received by:	[signature]	Title:	Date: 12/1/93
Relinquished by:	[signature]	Title:	Date: 12/10/93
Received by:	[signature]	Title:	Date: 12/15/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSP-3

Date: 12/6-12/7

Filter I.D. 14249

Prepared by:	NAWC LAB LEC	Title:	Date:
Relinquished by:	NAWC LAB LEC	Title:	Date:
Received by:	Tom Wescott	Title:	Date: 12/11/93
Relinquished by:	Tom Wescott	Title:	Date: 12/10/93
Received by:	L. Gingras	Title:	Date: 12/15/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

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PM_{10} FILTER CHAIN-OF-CUSTODY RECORD

Site: TSC-2

Date: 12/6-12/7

Filter I.D. 14250

Prepared by:	NAWC LAB LEC	Title:	Date:
Relinquished by:	NAWC LAB LEC	Title:	Date:
Received by:	Tom Linwood	Title:	Date: 12/1/93
Relinquished by:	Tom Linwood	Title:	Date: 12/10/93
Received by:	Lila Canyon	Title:	Date: 12/15/93
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:
Relinquished by:		Title:	Date:
Received by:		Title:	Date:

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CHAIN OF CUSTODY RECORD

NORTH AMERICAN WEATHER CONSULTANTS

CLIENT [illegible]

PROJECT 0419?

SAMPLE SITE [illegible]

FIELD SAMPLE NO.	LAB ID NUMBER	SAMPLE MEDIA AND COLLECTION METHOD	CONTAINER NUMBER	CONTAINER DESCRIPTION	ANALYTES	REMARKS
14223		Soil [illegible]				
14224		" "				
14225		" "				
14226		" "				
14231		" "				
14232		" "				
14234		" "				
14235		" "				
14236		" "				
14237		" "				
14238		" "				
14239		" "				
14240		" "				
14241		" "				
14242		" "				
14243		" "				

RELINQUISHED BY / PHONE	DATE/TIME	REASON FOR EXCHANGE:	COMMENTS:
[illegible] 582-8500	12-16-91 1430	Change to Lab [illegible] for Analysis	[illegible]
RELINQUISHED BY: PHONE:	DATE/TIME	REASON FOR EXCHANGE:	COMMENTS:
RELINQUISHED BY: PHONE:	DATE/TIME	REASON FOR EXCHANGE:	COMMENTS:
RELINQUISHED BY: PHONE:	DATE/TIME	REASON FOR EXCHANGE:	COMMENTS:

NORTH AMERICAN WEATHER CONSULTANTS

CHAIN OF CUSTODY RECORD

CLIENT [illegible]

PROJECT 011142

SAMPLE SITE Tooele Army Depot

FIELD SAMPLE NO.	LAB ID NUMBER	SAMPLE MEDIA AND COLLECTION METHOD	CONTAINER NUMBER	CONTAINER DESCRIPTION	ANALYTES	REMARKS
14344		Bare Glass Fiber Filter				
14345		" "				
14346		" "				
14347		" "				
14348		" "				
14349		" "				
14350		" "				

RELINQUISHED BY	DATE/TIME	REASON FOR EXCHANGE	COMMENTS
[illegible] PHONE: 972 3500	[illegible]	Given to lab chem for Analysis	[illegible]
RELINQUISHED BY: PHONE:	DATE/TIME	REASON FOR EXCHANGE:	COMMENTS:
RELINQUISHED BY: PHONE:	DATE/TIME	REASON FOR EXCHANGE:	COMMENTS:
RELINQUISHED BY: PHONE	DATE/TIME	REASON FOR EXCHANGE:	COMMENTS:

CHAIN OF CUSTODY RECORD

NORTH AMERICAN WEATHER CONSULTANTS

CLIENT

PROJECT

SAMPLE SITE

FIELD SAMPLE NO.	LAB ID NUMBER	SAMPLE MEDIA AND COLLECTION METHOD	CONTAINER NUMBER	CONTAINER DESCRIPTION	ANALYTES	REMARKS

RELINQUISHED BY:	DATE/TIME	REASON FOR EXCHANGE:	COMMENTS:
PHONE:			
RELINQUISHED BY:	DATE/TIME	REASON FOR EXCHANGE:	COMMENTS:
PHONE:			
RELINQUISHED BY:	DATE/TIME	REASON FOR EXCHANGE:	COMMENTS:
PHONE:			
RELINQUISHED BY:	DATE/TIME	REASON FOR EXCHANGE:	COMMENTS:
PHONE:			

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WHITE - TO LAB PINK - CLIENT YELLOW - SAMPLER

CHAIN OF CUSTO[illegible] RECORD

WEATHER CONSULTANTS

CLIENT: Montgomery Watson
PROJECT: 04142

SAMPLE SITE: Tooele Army Depot

FIELD SAMPLE NO.	LAB ID NUMBER	SAMPLE MEDIA AND COLLECTION METHOD	CONTAINER NUMBER	CONTAINER DESCRIPTION	ANALYTES	REMARKS
14219		8x10" Glass-fiber filter				
14220		" "				
14221		" "				
14222		" "				
14227		" "				
14228		" "				
14229		" "				
14230		" "				

RELINQUISHED BY:	DATE/TIME	REASON FOR EXCHANGE:	COMMENTS:
PHONE: 322 3540	11/19/93 12:18	Ground Transportation Custody	
RELINQUISHED BY: [illegible] Hamed PHONE:	DATE/TIME [illegible] 12:18	REASON FOR EXCHANGE:	COMMENTS:
RELINQUISHED BY: PHONE:	DATE/TIME	REASON FOR EXCHANGE:	COMMENTS:
RELINQUISHED BY: PHONE:	DATE/TIME	REASON FOR EXCHANGE:	COMMENTS:

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WHITE - TO LAB PINK - CLIENT YELLOW - SAMPLER

APPENDIX F

Field Data Summary/Calculation
for MFC Samplers Forms

FOR MFC SAMPLER

Project A142 Filter No. 14250 Sampler ID TSP-2

Part A. Field Data (Vol. of air sampled)

Site #1 Date, on 12/6/93 off 12/7/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	▲ P_m in. H_2O
Stop			
Start		BLANK	
Total, Hrs.			
Mean			

Sample Period: 12/6-12/7

Tav (Average Temp.) _____ °C _____ °K

Pav (Average Barom. Press.) _____ mmHg

Sampler Calibration Relationship:

m = _____

b = _____

r = _____

Calib. Date: _____

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ▲P_m (Tav/Pav]$^{1/2}$-b} {1/m} Elapsed Time _____ min

$\overline{Qa}$ = _____ m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

ON 15°C

AT 14°C

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6528	12/15/93	TBW
Tare	3.6520	9/28/93	LBR
Net (Wn)	0.0008	12/15/93	TBW

Part C. PM_{10} Calculations:

$\overline{Qstd} = \overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ _____ std m^3/min Vstd _____ std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration _____ µg/std m^3

Performed by: _____ Checked by: _____

Project A142 Filter No. 13249 Sampler ID TSP-3

Part A. Field Data (Vol. of air sampled)

Site _____ Date, on 12/6/93 off 12/7/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop			
Start		FLAT	
Total, Hrs.			
Mean			

Sample Period: 12/6 - 12/7

Tav (Average Temp.) _____ °C _____ °K

Pav (Average Barom. Press.) _____ mmHg

Sampler Calibration Relationship:

m = _____

b = _____

r = _____

Calib. Date: _____

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)]$^{1/2}$-b} {1/m} Elapsed Time _____ min

$\overline{Qa}$ = _____ m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

on 1445

off 1400

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6394	12/15/93	TGW
Tare	3.6394	9/28/93	CDC
Net (Wn)	0.0000	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd} = \overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ _____ std m^3/min Vstd _____ std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration _____ µg/std m^3

Performed by: _____ Checked by: _____

FOR MFC SAMPLER

Project A142 Filter No. 12248 Sampler ID TSP-1

Part A. Field Data (Vol. of air sampled)

Site _____ Date, on 12/6/93 off 12/7/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop			
Start		BLANK	
Total, Hrs.			
Mean			

Sample Period: 12/6 - 12/7

Tav (Average Temp.) _____ °C _____ °K

Pav (Average Barom. Press.) _____ mmHg

Sampler Calibration Relationship:

m = _____

b = _____

r = _____

Calib. Date: _____

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)]$^{1/2}$-b} {1/m} Elapsed Time _____ min

$\overline{Qa}$ = _____ m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

ON 12/CC

OFF 12/CC

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6500	12/15/93	TBW
Tare	3.6505	9/28/93	CEE
Net (Wn)	-0.0005	12/15/93	TBW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ _____ std m^3/min Vstd _____ std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration _____ µg/std m^3

Performed by: _____ Checked by: _____

Project A142 Filter No. 12247 Sampler ID TSP-5

Part A. Field Data (Vol. of air sampled)

Site #2 Date, on 12/8/93 off 12/14/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop			
Start		BLANK	
Total, Hrs.			
Mean			

Sample Period: 12/8 - 12/14

Tav (Average Temp.) _____ °C _____ °K

Pav (Average Barom. Press.) _____ mmHg

Sampler Calibration Relationship:

m = _____

b = _____

r = _____

Calib. Date: _____

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)]$^{1/2}$-b} {1/m} Elapsed Time _____ min

$\overline{Qa}$ = _____ m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

DN 1330

OFF 1400

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6530	12/15/93	TGW
Tare	3.6526	9/28/93	CEC
Net (Wn)	0.0004	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = ($\overline{Qstd}$)(elapsed time)

$\overline{Qstd}$ _____ std m^3/min Vstd _____ std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration _____ μg/std m^3

Performed by: _____ Checked by: _____

FOR MFC SAMPLER

Project A142 Filter No. 14246 Sampler ID TSP-3

Part A. Field Data (Vol. of air sampled)

Site #4 Date, on 12/3/93 off 12/6/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		47100.4	1.9
Start		46737	1.8
Total, Hrs.		11.78	
Mean			1.85

Sample Period: 12/3 - 12/3

Tav (Average Temp.) -2.7 °C 270.3 °K

Pav (Average Barom. Press.) 628.41 mmHg

Sampler Calibration Relationship:
m = 0.4906
b = 0.0611
r = 0.99933

Calib. Date: 7/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 7067 min

$\overline{Qa}$ = 1.6937 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6810	12/15/93	TGW
Tare	3.6596	9/28/93	LEE
Net (Wn)	0.0214	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = ($\overline{Qstd}$)(elapsed time)

$\overline{Qstd}$ 1.5440 std m^3/min Vstd 1091.117 std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration 19.61 µg/std m^3

Performed by: TGW Checked by: LGW

Project A142 Filter No. 14245 Sampler ID TSP-1

Part A. Field Data (Vol. of air sampled)

Site #3 Date, on 12/2/93 off 12/6/93

Sample Period: 12/2 - 12/3

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		63813.2	1.9
Start		62366.1	1.6
Total, Hrs.		24.12	
Mean			1.75

Tav (Average Temp.) ~~18~~ 2.7 °C ~270.3 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = 0.4798

b = 0.0497

r = 0.9995

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)$^{1/2}$-b} {1/m} Elapsed Time 1447.1 min

$\overline{Qa}$ = 1.7047 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.70299	12/15/93	TGW
Tare	3.6673	9/28/93	CEC
Net (Wn)	0.0356	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ 1.5539 std m^3/min Vstd 2248.693 std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration 15.85 µg/std m^3

Performed by: TGW Checked by: TGW

FOR MFC SAMPLER

Project A142 Filter No. 14244 Sampler ID TSP-5

Part A. Field Data (Vol. of air sampled)

Site #2 Date, on 12/2/93 off 12/6/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		137375	5.3
Start		12779.2	5.6
Total, Hrs.		24.31	
Mean		~~1458.3~~	5.45

Sample Period: 12/2 - 12/3

Tav (Average Temp.) -2.7 °C 270.5 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = 0.9973

b = 0.1149

r = 0.9990

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1458.30 min

$\overline{Qa}$ = 1.4200 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7120	12/15/93	TGW
Tare	3.6667	9/28/93	CEC
Net (Wn)	0.0453	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ 1.2945 std m^3/min Vstd 1887.697 std m^3 TGW

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration 24.00 µg/std m^3

Performed by: TGW Checked by: VP

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Project A142 Filter No. 11243 Sampler ID TSP-2 (TSP-4)

Part A. Field Data (Vol. of air sampled)

Site #1 Date, on 12/2/93 off 12/6/93

Sample Period: 12/2 - 12/3

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		209570	1.55
Start		2027.8	1.55
Total, Hrs.			
Mean		12.17	1.55

Tav (Average Temp.) -2.7 °C 270.3 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = 0.4981

b = 0.0462

r = 0.99937

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav]$^{1/2}$-b} {1/m} Elapsed Time 730.20 min

$\overline{Qa}$ = 1.5465 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6762	12/15/93	HGW
Tare	3.6562	9/22/93	LOC
Net (Wn)	0.0200	12/15/93	HGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ 1.4098 std m^3/min Vstd 1029.408 std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration 19.43 µg/std m^3

Performed by: HGW Checked by: _____

FOR MFC SAMPLER

Project A162 Filter No. 42 Sampler ID TSP-3

Part A. Field Data (Vol. of air sampled)

Site #4 Date, on 11/27/93 off 12/2/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		46391.7	1.8
Start		44929.4	1.75
Total, Hrs.		24.37	
Mean			1.88

Sample Period: 11/27-11/28

Tav (Average Temp.) -5.41 °C 267.6 °K

Pav (Average Barom. Press.) 625.41 mmHg

Sampler Calibration Relationship:
m = 0.7906
b = 0.0611
r = 0.99933

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1462.30 min

$\overline{Qa}$ = 1.6993 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6818	12/15/93	TGW
Tare	3.6326	9/28/93	CEC
Net (Wn)	0.0492	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = ($\overline{Qstd}$)(elapsed time)

$\overline{Qstd}$ 1.5646 std m³/min Vstd 2287.986 std m³

PM_{10} Concentration = (Wn)(10⁶)/Vstd PM_{10} Concentration 21.50 µg/std m³

Performed by: TGW Checked by: [illegible]

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Project A142 Filter No. 241 Sampler ID TSP-1

Part A. Field Data (Vol. of air sampled)

Site #3 Date, on 11/25/93 off 12/1/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		623643	1.6
Start		609200.3	1.6
Total, Hrs.			
Mean		24.07	1.6

Sample Period: 11/27 - 11/28

Tav (Average Temp.) -5.41 °C 267.6 °K

Pav (Average Barom. Press.) 628.41 mmHg

Sampler Calibration Relationship:

m = 0.4798

b = 0.0497

r = 0.99975

Calib. Date: 9/15/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)]$^{1/2}$-b} {1/m} Elapsed Time 1444.0 min

$\overline{Qa}$ = 1.6168 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6947	12/15/93	TGW
Tare	3.6547	9/28/93	LEC
Net (Wn)	0.0400	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ 1.4987 std m^3/min Vstd 2149.658 std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration 18.61 µg/std m^3

Performed by: TGW Checked by: _____

Project 4142 Filter No. 14240 Sampler ID T-5

Part A. Field Data (Vol. of air sampled)

Site #2 Date, on 11/13/93 off 12/2/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	▲ P_{ai} in. H_2O
Stop		12275.7	5.85
Start		10827.93	6.01
Total, Hrs.		1447.77	
Mean			5.93

Sample Period: 11/17/93 - 11/18

Tav (Average Temp.) -5.4 °C 267.6 °K

Pav (Average Barom. Press.) 628.41 mmHg

Sampler Calibration Relationship:

m = 0.9975

b = 0.1149

r = 0.99930

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ▲P_{ai} (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1447.90 - _____ min

$\overline{Qa}$ = 1.1752 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7013	12/15/93	TGW
Tare	3.6550	9/28/93	LEC
Net (Wn)	0.0463	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = ($\overline{Qstd}$)(elapsed time)

$\overline{Qstd}$ 1.1611 std m^3/min Vstd 1970.685 std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration 23.49 µg/std m^3

Performed by: TGW Checked by: LEC

Project A142 Filter No. 11239 Sampler ID PM-2 CTSP-HD

Part A. Field Data (Vol. of air sampled)

Site #1 Date, on 11/23/93 off 12/2/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		20224.9	1.6
Start		19942.2	1.6
Total, Hrs.			
Mean		21.38	1.6

Sample Period: 11/47 - 11/75

Tav (Average Temp.) 5.4 °C 267.6 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:
m = 0.4981
b = 0.0462
r = 0.99937

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1252.70 ✓ min

$\overline{Qa}$ = ~~1.8254~~ 1.5644 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period:
Note: Inlet from TSP-4 was put in this sampler

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6949	12/15/93	TGW
Tare	3.6497	9/28/93	LFC
Net (Wn)	0.0552	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ 1.4405 std m³/min Vstd 1947.677 std m³

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration 19.05 µg/std m³

Performed by: TGW Checked by: LFC

FOR MFC SAMPLER

Project A142 Filter No. 14238 Sampler ID ISD-3

Part A. Field Data (Vol. of air sampled)

Site #4 Date, on 11/20/93 off 11/23/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	▲ P_{st} in. H_2O
Stop		449270	~~1.9~~ 2.0
Start		434650	1.95
Total, Hrs.			
Mean		24.32	1.98

Sample Period: 11/20 - 11/21

Tav (Average Temp.) -1.0 °C 272.0 °K

Pav (Average Barom. Press.) 628.41 mmHg

Sampler Calibration Relationship:
m = 0.4906
b = 0.0611
r = 0.99933
Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ▲P_{st} (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1459.0 min

$\overline{Qa}$ = 1.7625 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7130	12/15/93	TGW
Tare	3.6456	9/28/93	LEC
Net (Wn)	0.0674	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ 1.5966 std m³/min Vstd 2329.367 std m³

PM_{10} Concentration = (Wn)(10⁶)/Vstd PM_{10} Concentration 28.93 µg/std m³

Performed by: TGW Checked by: LEC

Project A142 Filter No. 14237 Sampler ID TSP-1

Part A. Field Data (Vol. of air sampled)

Site #5 Date, on 11/20/93 off 11/23/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		60916.1	~~1.5~~ 1.2
Start		57478.1	1.9
Total, Hrs.		23.97	
Mean			1.9

Sample Period: 11/20 - 11/21

Tav (Average Temp.) -10 °C 272.0 °K

Pav (Average Barom. Press.) 628.21 mmHg

Sampler Calibration Relationship:

m = 0.4778

b = 0.0497

r = 0.99975

Calib. Date: 9/15/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1438.0 min

$\overline{Qa}$ = 1.7865 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7116	12/15/93	TGC
Tare	3.6512	9/28/93	LBC
Net (Wn)	0.0604	12/15/93	TGC

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ 1.6183 std m^3/min Vstd 2327159 std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration 25.95 µg/std m^3

Performed by: TGC Checked by: LFC

FOR MFC SAMPLER

Project A142 Filter No. 14236 Sampler ID TSP-5

Part A. Field Data (Vol. of air sampled)

Site #7 Date, on 11/20/93 off 11/23/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		103175	6.0
Start		093544	6.0
Total, Hrs.		24.22	
Mean			6.0

Sample Period: 11/20 - 11/21

Tav (Average Temp.) -1.0 °C 272.0 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = 0.9973

b = 0.1149

r = 0.99930

Calib. Date: 9/15/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 14531 min

$\overline{Qa}$ = 1.5007 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7136	12/15/93	TGW
Tare	3.6459	9/28/93	LEC
Net (Wn)	0.0677	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = ($\overline{Qstd}$)(elapsed time)

$\overline{Qstd}$ 1.3594 std m³/min Vstd 1975.356 std m³

PM_{10} Concentration = (Wn)(10⁶)/Vstd PM_{10} Concentration 3427 µg/std m³

Performed by: TGW Checked by: LEC

Project A142 Filter No. 14235 Sampler ID TSP-3

Part A. Field Data (Vol. of air sampled)

Site #4 Date, on 11/12/93 off 11/20/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		43466.2	1.95
Start		42005.5	1.8
Total, Hrs.			
Mean		24.35	1.88

Sample Period: 11/14 - 11/15

Tav (Average Temp.) -1.2 °C 271.8 °K

Pav (Average Barom. Press.) 623.4 mmHg

Sampler Calibration Relationship:
m = 0.4906
b = 0.0611
r = 0.99933

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1460.70 min

$\overline{Qa}$ = ~~1.7470~~ 1.7135 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7608	12/15/93	TGW
Tare	3.6620	9/28/93	LBC
Net (Wn)	0.0988	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav)

$\overline{Qstd}$ ~~1.5857~~ 1.5534 std m³/min

PM_{10} Concentration = (Wn)(10⁶)/Vstd

Vstd = $\overline{(Qstd)}$(elapsed time)

Vstd ~~2312.554~~ 2268.99 std m³

PM_{10} Concentration ~~42.74~~ 43.54 µg/std m³

Performed by: TGW Checked by: LBC

FOR MFC SAMPLER

Project A142 Filter No. 11234 Sampler ID TSP-1

Part A. Field Data (Vol. of air sampled)

Site #3 Date, on 11/12/93 off 11/20/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		5947.8	1.9
Start		5923.5	2.0
Total, Hrs.			
Mean		23.97	1.95

Sample Period: 11/14 - 11/15

Tav (Average Temp.) -1.2 °C 271.8 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = 0.4798

b = 0.0497

r = 0.99975

Calib. Date: 9/15/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1439.3 min

$\overline{Qa}$ = ~~1.5454~~ 1.8105 TGW m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7483	12/15/93	TGW
Tare	3.6555	9/28/93	LEC
Net (Wn)	0.0928	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time) TGW

$\overline{Qstd}$ ~~1.6436~~ 1.6413 std m³/min Vstd ~~2326.775~~ 2360.66 std m³ TGW

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration ~~39.99~~ 39.31 µg/std m³

Performed by: TGW Checked by: LF

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Project A142 Filter No. 11233 Sampler ID TSP-5

Part A. Field Data (Vol. of air sampled)

Site #7 Date, on 11/14/93 off 11/15/93

Sample Period: 11/14 - 11/15

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		07543.1	6.0
Start		07542.8	5.8
Total. Hrs.		24.23	
Mean			5.9

Tav (Average Temp.) -1.2 °C 271.8 °K

Pr (Average Barom. Press.) 628.41 mmHg

Sampler Calibration Relationship:
m = 0.9973
b = 0.1149
r = 0.99993

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 2423 1453.80 min

$\overline{Qa}$ = 1.4866 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7596	12/15/93	TGW
Tare	3.6548	9/28/93	UBC
Net (Wn)	0.1048	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav)

$\overline{Qstd}$ 1.3477 std m³/min

PM_{10} Concentration = (Wn)(10⁶)/Vstd

Vstd = $\overline{(Qstd)}$(elapsed time)

Vstd 1959.22 1990.59 std m³

PM_{10} Concentration 53.49 µg/std m³

Performed by: TGW Checked by: _____

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FOR MFC SAMPLER

Project A142 Filter No. 31 Sampler ID TSP-2

Part A. Field Data (Vol. of air sampled)

Site #1 Date, on 11/12/93 off 11/20/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		~~1893.2~~	
Start		~~1784.6~~	5.8
Total, Hrs.		~~108.6~~	
Mean		16.14	5.8

Sample Period: 11/14-11/15

Tav (Average Temp.) -1.2 °C 271.8 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:
m = 1.0105
b = 0.0137
r = 0.99987

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification LEC

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time ~~1614~~ 968.40 min 968.6

$\overline{Qa}$ = 1.5539 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period:

T.C Generator died, unable to take final flow reading

MFC sampler heater wires - cold to started from coming out

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7154	12/15/93	TGW
Tare	3.6471	9/28/93	LEC
Net (Wn)	0.0683	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ ~~1.5396~~ 1.4087 std m³/min Vstd ~~2199.5~~ ~~1315.068~~ 1364.15 std m³

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration ~~51.91~~ 50.07 µg/std m³

Performed by: TGW Checked by: _____

Project A142 Filter No. 12230 Sampler ID ISA-3

Part A. Field Data (Vol. of air sampled)

Site #4 Date, on 11/11/93 off 11/12/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop			
Start		BLANK	
Total, Hrs.			
Mean			

Sample Period: 11/11 - 11/12

Tav (Average Temp.) _____ °C _____ °K

Pav (Average Barom. Press.) _____ mmHg

Sampler Calibration Relationship:

m = _____

b = _____

r = _____

Calib. Date: _____

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)]$^{1/C}$-b} {1/m} Elapsed Time _____ min

$\overline{Qa}$ = _____ m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

ON 1315

OFF 1310

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6560		
Tare	3.6568	9/28/93	CER
Net (Wn)	-.0008		

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = ($\overline{Qstd}$)(elapsed time)

$\overline{Qstd}$ _____ std m^3/min Vstd _____ std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration _____ µg/std m^3

Performed by: _____ Checked by: _____

FOR MFC SAMPLER

Project A142 Filter No. 14229 Sampler ID TSP-1

Part A. Field Data (Vol. of air sampled)

Site #3 Date, on 11/11/93 off 11/12/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		BLANK	
Start			
Total, Hrs.			
Mean			

Sample Period: 11/11 - 11/12

Tav (Average Temp.) _____ °C _____ °K

Pav (Average Barom. Press.) _____ mmHg

Sampler Calibration Relationship:

m = _____

b = _____

r = _____

Calib. Date: _____

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time _____ min

$\overline{Qa}$ = _____ m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

ON 1740

OFF 1750

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6590		
Tare	3.6587	9/28/93	LEC
Net (Wn)	.0003		

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ _____ std m^3/min Vstd _____ std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration _____ µg/std m^3

Performed by: _____ Checked by: _____

Project A142 Filter No. 14228 Sampler ID TSP-5

Part A. Field Data (Vol. of air sampled)

Site #2 Date, on 11/11/93 off 11/12/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		BLANK	
Start			
Total, Hrs.			
Mean			

Sample Period: 11/11 - 11/12

Tav (Average Temp.) _____ °C _____ °K

Pav (Average Barom. Press.) _____ mmHg

Sampler Calibration Relationship:

m = _____

b = _____

r = _____

Calib. Date: _____

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time _____ min

$\overline{Qa}$ = _____ m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

ON 1200

OFF 1235

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6666		
Tare	3.6658	9/28/93	CAC
Net (Wn)	.0008		

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ _____ std m^3/min Vstd _____ std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration _____ µg/std m^3

Performed by: _____ Checked by: _____

FOR MFC SAMPLER

Project A142 Filter No. 14227 Sampler ID TSP-2

Part A. Field Data (Vol. of air sampled)

Site #1 Date, on 11/11/93 off 11/12/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop			
Start		BLANK	
Total, Hrs.			
Mean			

Sample Period: 11/11 - 11/12

Tav (Average Temp.) _____ °C _____ °K

Pav (Average Barom. Press.) _____ mmHg

Sampler Calibration Relationship:

m = _____

b = _____

r = _____

Calib. Date: _____

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time _____ min

$\overline{Qa}$ = _____ m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

ON 1120

OFF 1220

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6618		
Tare	3.6611	9/28/93	LBC
Net (Wn)	10.0		

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ _____ std m^3/min Vstd _____ std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration _____ μg/std m^3

Performed by: _____ Checked by: _____

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Project A142 Filter No. 14228 Sampler ID TSP-3

Part A. Field Data (Vol. of air sampled)

Site #4 Date, on 11/8/93 off 11/11/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		41953.9	1.8
Start		40527.4	1.7
Total, Hrs.			
Mean		1461.5	1.75

Sample Period: 11/8 - 11/9

Tav (Average Temp.) 2.7 °C 276.7 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = 0.4906

b = 0.0611

r = 0.99933

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)$^{1/2}$-b} {1/m} Elapsed Time 1461.5 min

$\overline{Qa}$ = 1.6647 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7293	12/15/93	TSW
Tare	3.6545	9/28/93	LEC
Net (Wn)	0.0748	12/15/93	TSW

Part C. PM_{10} Calculations:

$\overline{Qstd} = \overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ 1.4574 std m^3/min Vstd 2166.55 std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration 34.53 µg/std m^3

Performed by: TSW Checked by: LEC

Project A142 Filter No. 11225 Sampler ID TSP-1

Part A. Field Data (Vol. of air sampled)

Site #3 Date, on 11/8/93 off 11/11/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		580236	2.05
Start		56629.4	2.1
Total, Hrs.			
Mean		1394.2	2.075

Sample Period: 11/8 - 11/9

Tav (Average Temp.) 2.7 °C 276.7 °K

Pav (Average Barom. Press.) 628.41 mmHg

Sampler Calibration Relationship:
m = 0.4798
b = 0.0497
r = 0.99975

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1394.2 min

$\overline{Qa}$ = 1.5336 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7145	12/15/93	TGW
Tare	3.6553	9/28/93	LBC
Net (Wn)	0.0590	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = ($\overline{Qstd}$)(elapsed time)

$\overline{Qstd}$ 1.6818 std m^3/min Vstd 2344.74 std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration 25.16 µg/std m^3

Performed by: TGW Checked by: _____

Project A142 Filter No. 14224 Sampler ID ISP-S

Part A. Field Data (Vol. of air sampled)

Site #2 Date, on 11/7/93 off 11/11/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		07838.2	5.7
Start		06381.6	5.5
Total, Hrs.			
Mean		1456.6	5.6

Sample Period: 11/8 - 11/9

Tav (Average Temp.) 2.7 °C 276.7 °K

Pav (Average Barom. Press.) 628.21 mmHg

Sampler Calibration Relationship:

m = 0.9973

b = 0.1149

r = 0.99930

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1456.6 ✓ min

$\overline{Qa}$ = 1.4593 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	37517	12/15/93	TGW
Tare	36546	9/28/93	LEC
Net (Wn)	0.0971	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ 1300 std m^3/min Vstd 1892.86 std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration 51.30 μg/std m^3

Performed by: TGW Checked by: LEC

FOR MFC SAMPLER

Project A142 Filter No. 1223 Sampler ID TSP-2

Part A. Field Data (Vol. of air sampled)

Site = Date, on 11-7-93 off 11/11/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		17939.9	6.0
Start		16484.4	5.8
Total, Hrs.			
Mean		1455.5	5.9

Sample Period: 11/8 - 11/8

Tav (Average Temp.) 2.7 °C 276.7 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:
m = 1.0105
b = 0.0137
r = 0.99987

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1455 min

$\overline{Qa}$ = 1.5815 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period:

Performed by: Checked by:

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7621	12/15/93	TGW
Tare	3.6553	9/28/93	LEC
Net (Wn)	0.1068	12/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ 1.4083 std m^3/min Vstd 2049.77 std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration 52.10 µg/std m^3

Performed by: TGW Checked by: LEC

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Project A142 Filter No. 4226 Sampler ID TSP-3

Part A. Field Data (Vol. of air sampled)

Site #4 Date, on 11/2/93 off 11/5/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		40525.7	1.8
Start	~~39087~~	39078.7	1.9
Total, Hrs.		1447.0	
Mean			1.85

Sample Period: 11/2 - 11/5

Tav (Average Temp.) 3.7 °C 276.7 °K

Pav (Average Barom. Press.) 628.41 mmHg

Sampler Calibration Relationship: TGW

0.4906 m = ~~0.6536~~ 0.6693

0.0611 b = ~~0.0479~~ 0.0593

r^2 = ~~0.99975~~ 0.99933

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)]$^{1/2}$-b} {1/m} Elapsed Time 1447.0 min

$\overline{Qa}$ = ~~1.2618~~ 1.715 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.8245	11/15/93	TGW
Tare	3.6553	9/28/93	CGC
Net (Wn)	0.1692	11/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time) 2269.57

$\overline{Qstd}$ ~~1.1736~~ 1.527 std m^3/min Vstd ~~1625.542~~ std m^3 TGW 16.56

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration ~~104.07~~ µg/std m^3

Performed by: TGW Checked by: [illegible]

Project A142 Filter No. 14221 Sampler ID TSP-1

Part A. Field Data (Vol. of air sampled)

Site #3 Date, on 11/4/93 off 11/7/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		56626.7	2.1
Start		55185.3	2.0
Total, Hrs.			
Mean		1441.4	2.05

Sample Period: 11/2 - 11/3

Tav (Average Temp.) 3.7 °C 276.7 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~0.65360~~ 4798

b = ~~0.0429~~ 0497

r = 0.99975

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1441.4 min

$\overline{Qa}$ = ~~1.3803~~ 1.877 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.8053	11/15/93	HGW
Tare	3.6490	9/28/93	LGC
Net (Wn)	0.1563	11/15/93	HGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ 1.2292 1.671 std m^3/min Vstd 1771.74 1403.7 std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration ~~88.22~~ 64.89 HGW µg/std m^3

Performed by: HGW Checked by: LGC

Project A142 Filter No. 11220 Sampler ID ISP-S

Part A. Field Data (Vol. of air sampled)

Site #2 Date, on 11/7/93 off _____

Sample Period: 11/7 - 11/3

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		~~0637.7~~	~~5.5~~
Start		~~0497.3.2~~	~~5.7~~
Total, Hrs.			
Mean		1456.5	5.6

Tav (Average Temp.) 3.7 °C ~~277~~ °K

Pav (Average Barom. Press.) ~~628.4~~ mmHg

Sampler Calibration Relationship:

m = ~~1.3586~~ 0.9973

b = ~~0.444~~ 0.1149

r = 0.99930

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)]$^{1/C}$-b} {1/m} Elapsed Time 1456.5 min

$\overline{Qa}$ = ~~1.6744~~ 1.459 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.9209	11/15/93	TGW
Tare	3.6459	9/28/93	Lab
Net (Wn)	0.2750	11/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd} = \overline{Qa}$ (Pav/Pstd) (Tstd/Tav)

$\overline{Qstd}$ ~~0.9765~~ 1.302 std m³/min

PM_{10} Concentration = (Wn)(10^6)/Vstd

Vstd = $\overline{(Qstd)}$(elapsed time)

Vstd ~~1395.109~~ 1893.45 std m³ TGW

PM_{10} Concentration ~~197.40~~ 145.29 µg/std m³

Performed by: TGW Checked by: LEC

FOR MFC SAMPLER

Project A142 Filter No. 14219 Sampler ID TSP-2

Part A. Field Data (Vol. of air sampled)

Site #1 Date, on 11-2-93 off 11-3-93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	▲ P_{ss} in. H_2O
Stop		15492	5.3
Start		15022.8	5.6
Total, Hrs.		1459.4	
Mean			5.7

Sample Period: 11/2 - 11/3

Tav (Average Temp.) 3.7 °C 276.7 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~1.3765~~ 1.0105

b = ~~0.0099~~ 0.0137

r = 0.99987

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ▲P_{ss} (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1459.4 min

$\overline{Qa}$ = ~~1.1437~~ 1.5541 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.8914	11/15/93	TGW
Tare	3.6533	9/28/93	LBC
Net (Wn)	0.2381	11/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = ($\overline{Qstd}$)(elapsed time)

$\overline{Qstd}$ ~~1.0185~~ 1.384 std m³/min Vstd ~~1486.358~~ 2019.81 std m³ TGW

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration ~~1609~~ 11788 µg/std m³

Performed by: TGW Checked by: LBC

Project A142 Filter No. 14210 Sampler ID TSP-1

Part A. Field Data (Vol. of air sampled)

Site #3 Date, on 10/26/93 off 10/29/93

Sample Period: 10/27 - 10/28

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		55518.0	2.0
Start		53754.7	1.95
Total, Hrs.		1429.3	
Mean			1.98

Tav (Average Temp.) 75 °C 298.5 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~0.6536~~ 0.4798

b = ~~0.0477~~ 0.0497

r = ~~0.9995~~

Calib. Date: 9/15/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)]$^{1/2}$-b} {1/m} Elapsed Time 1429.3 min

$\overline{Qa}$ = ~~1.3651~~ 1.856 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7162	11/15/93	TGW
Tare	3.6497	9/28/93	LEC
Net (Wn)	0.0665	11/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav)

$\overline{Qstd}$ ~~1.4997~~ 1.630 std m³/min

PM_{10} Concentration = (Wn)(10⁶)/Vstd

Vstd = $\overline{(Qstd)}$(elapsed time) 2329.76

Vstd ~~1713.887~~ std m³ 28.54 TGW

PM_{10} Concentration ~~3880~~ µg/std m³

Performed by: TGW Checked by: LEC

FOR MFC SAMPLER

Project A142 Filter No. 11217 Sampler ID TSP-3

Part A. Field Data (Vol. of air sampled)

Site #4 Date, on 10/26/93 off 11/4/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		39076.9	1.9
Start		37632.4	1.8
Total, Hrs.		1444.5	
Mean			1.85

Sample Period: 10/27 - 10/28

Tav (Average Temp.) 7.5 °C 280.5 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~0.6683~~ 0.4906

b = ~~0.0595~~ 0.0611

r = 0.99953

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1444.5 min

$\overline{Qa}$ = ~~1.2740~~ 1.728 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7336	11/15/93	TGW
Tare	3.6559	9/28/93	LEC
Net (Wn)	0.0777	11/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ ~~1.1765~~ 1.518 std m³/min Vstd ~~1614.773~~ 2192.75 std m³ 35.44 TGW

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration ~~48.18~~ µg/std m³

Performed by: TGW Checked by: LEC

Project A142 Filter No. 14216 Sampler ID TSP-5

Part A. Field Data (Vol. of air sampled)

Site #2 Date, on 10/26/93 off 11/4/93

Sample Period: 10/27 TGW - 10/28

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter 04122.5	ΔP_m in. H_2O
Stop		~~5 21536~~	5.7
Start		03467.1	5.6
Total, Hrs.			
Mean		1455.4	5.65

Tav (Average Temp.) 7.5 °C ~~280.5~~ °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~1.3556~~ 0.9973

b = ~~0.444~~ 0.1149

r = 0.99930

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)]$^{1/2}$-b} {1/m} Elapsed Time 1455.4 min

$\overline{Qa}$ = ~~1.0871~~ 1.477 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7569	11/15/93	TGW
Tare	3.6575	9/28/93	LBC
Net (Wn)	0.0994	11/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav)

$\overline{Qstd}$ ~~0.9556~~ 1.298 std m^3/min

PM_{10} Concentration = (Wn)(10^6)/Vstd

Vstd = $\overline{(Qstd)}$(elapsed time)

Vstd ~~1389.84~~ 1889.11 std m^3

PM_{10} Concentration ~~71.52~~ 52.63 TGW µg/std m^3

Performed by: TGW Checked by: LBC

FOR MFC SAMPLER

Project A142 Filter No. 14215 Sampler ID TSP-2

Part A. Field Data (Vol. of air sampled)

Site #1 Date, on 10/26/93 off 11/2/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		13507.8	5.3
Start		13569.5	5.7
Total, Hrs.		24.23	
Mean			5.75

Sample Period: 10-27 & 10-28

Tav (Average Temp.) 7.5 °C 280.5 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~1.5765~~ 1.0105

b = ~~.00879~~ .00137

r = ~~0.99987~~

Calib. Date: 9/15/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1453.5 min

$\overline{Qa}$ = ~~1.1567~~ 1.1572 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.8116	11/15/93	TGW
Tare	3.6618	9/28/93	LEC
Net (Wn)	0.1498	11/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ ~~1.0460~~ 1.0551 std m³/min Vstd ~~1476.83~~ 2007.28 std m³ TGW

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration ~~1014.5~~ +38 7464 µg/std m³

Performed by: TGW Checked by: LEC

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Project 4142 Filter No. 14214 Sampler ID TSP-2

Part A. Field Data (Vol. of air sampled)

Site #1 Date, on 10-21-93 off 10-22-93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		1356.8	5.7
Start		1211.2.1	5.9
Total, Hrs.			
Mean		1454.7	5.8

Sample Period: 10/21 - 10/22

Tav (Average Temp.) 8.9 °C 282 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~1.3765~~ 1.005

b = ~~0.0577~~ 0.0157

r = ~~0.99987~~

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)$^{1/2}$-b} {1/m} Elapsed Time 1454.7 min

$\overline{Qa}$ = ~~1.6049~~ 1.583 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7108	11/5/93	TGW
Tare	3.6623	9/28/93	LEC
Net (Wn)	0.0485	11/5/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav)

$\overline{Qstd}$ ~~1.0478~~ 1.385 std m³/min

PM_{10} Concentration = (Wn)(10⁶)/Vstd

Vstd = $\overline{(Qstd)}$(elapsed time)

Vstd ~~1480.568~~ 2011.85 std m³

PM_{10} Concentration 3276 24.10 TGW µg/std m³

Performed by: TGW Checked by: LEC

FOR MFC SAMPLER

Project A142 Filter No. 14213 Sampler ID TSP-5

Part A. Field Data (Vol. of air sampled)

Site #2 Date, on 10-21-93 off 10/26/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		03463.2	5.7
Start		~~2152.5~~	5.8
Total, Hrs.			
Mean		1310.7	5.75

Sample Period: 10/21 - 10/22

Tav (Average Temp.) 4.9 °C 282 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~1.3586~~ 0.9973

b = ~~0.1117~~ 0.1149

r = 0.99990

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/c}$-b} {1/m} Elapsed Time 1310.7 min

$\overline{Qa}$ = ~~1.006~~ 1.495 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6970	11/15/93	TGA
Tare	3.6554	9/28/93	LEC
Net (Wn)	0.0416	11/15/93	TGA

Part C. PM_{10} Calculations:

$\overline{Qstd} = \overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ ~~0.9606~~ 1.307 std m³/min Vstd ~~1260.404~~ 1713.05 std m³

PM_{10} Concentration = (Wn)(10⁶)/Vstd PM_{10} Concentration ~~33.01~~ 24.29 TGA µg/std m³

Performed by: TGA Checked by: LEC

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Project A142 Filter No. 11212 Sampler ID TSP-3

Part A. Field Data (Vol. of air sampled)

Site #4 Date, on 10-21-93 off 10/26/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		37630.5	1.8
Start		36176.2	2.0
Total, Hrs.			
Mean		1454.3	1.9

Sample Period: 10/21 – 10/22

Tav (Average Temp.) 8.9 °C 282 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~0.4685~~ 0.4906

b = ~~0.0593~~ 0.0611

r = 0.99933

Calib. Date: 9/15/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)]$^{1/2}$-b} {1/m} Elapsed Time 1454.3 min

$\overline{Qa}$ = ~~1.7990~~ 1.758 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.7089	11/15/93	TGW
Tare	3.6559	9/28/93	LEC
Net (Wn)	0.0530 TGW	11/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav)

$\overline{Qstd}$ ~~1.7997~~ 1.536 std m³/min

PM_{10} Concentration = (Wn)(10⁶)/Vstd

Vstd = $\overline{(Qstd)}$(elapsed time)

Vstd ~~1647.946~~ 2233.50 std m³ TGW

PM_{10} Concentration ~~34.71~~ ~~32.46~~ 23.73 µg/std m³ TGW

Performed by: TGW Checked by: LEC.

FOR MFC SAMPLER

Project A142 Filter No. A211 Sampler ID TSP-1

Part A. Field Data (Vol. of air sampled)

Site #3 Date, on 10-27-93 off 10/28/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_w in. H_2O
Stop		53753.6	1.95
Start		52401.0	1.95
Total, Hrs.			
Mean		1352.6	1.95

Sample Period: 10/27 - 10/28

Tav (Average Temp.) 8.9 °C 282 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:
m = ~~0.6536~~ 0.4795
b = ~~0.0479~~ 0.0497
r = 0.99975
Calib. Date: 9/15/93

Date of Quarterly Calibration Verification _____ (27.5h

$\overline{Qa}$ = {[mean ΔP_w (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1352.6 min

$\overline{Qa}$ = ~~1.3550~~ 1.1846 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6988	11/15/93	TGW
Tare	3.6489	9/28/93	LEC
Net (Wn)	0.0499	11/15/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ ~~1.1865~~ 1.1605 std m^3/min Vstd ~~1604.864~~ 2181.74 std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration ~~31.09~~ 22.87 TGW µg/std m^3

Performed by: TGW Checked by: LEC

Project A142 Filter No. 14210 Sampler ID 18T-2

Part A. Field Data (Vol. of air sampled)

Site #1 Date, on 10/15/93 off 10/21/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		~~11319.1~~ ~~11322.2~~	~~5.7~~
Start		11203.3	6.0
Total, Hrs.		908.8	
Mean			~~5.85~~

Sample Period: 10/15 - 10/16

Tav (Average Temp.) 8.4 °C 281.4 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~1.3765~~ 1.0105

b = ~~0.0577~~ 0.0157

r = 0.99987

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)]$^{1/2}$-b} {1/m} Elapsed Time 908.8 min

$\overline{Qa}$ = ~~1.1686~~ 1.588 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period:

Occ 1400

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6586	10/18/93	TGW
Tare	3.6509	9/28/93	LEC
Net (Wn)	0.0077	10/18/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd} = \overline{Qa}$ (Pav/Pstd) (Tstd/Tav)

$\overline{Qstd}$ ~~1.0453~~ 1.391 std m^3/min

PM_{10} Concentration = (Wn)(10^9)/Vstd

Vstd = $\overline{(Qstd)}$(elapsed time)

Vstd ~~939.975~~ 1264.141 std m^3

PM_{10} Concentration ~~8.48~~ 6.09 TGW µg/std m^3

Performed by: TGW Checked by: LEC

Project A142 Filter No. 14209 Sampler ID TSP-5

Part A. Field Data (Vol. of air sampled)

Site #2 Date, on 10/15/93 off 10-21-93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		~~12110.8~~	5.9
Start		01284.2	5.7
Total, Hrs.		826.6	
Mean			5.8

Sample Period: 10/15 - 10/16

Tav (Average Temp.) 8.4 °C 281.4 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~1.3586~~ 0.9973

b = ~~0.444~~ 0.1149

r = 0.99990

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 826.6 min

$\overline{Qa}$ = ~~1.044~~ 1.501 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

M 1405

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6508	10/28/93	TGW
Tare	3.6449	9/28/93	LBC
Net (Wn)	0.0059	10/28/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ ~~0.9671~~ 1.314 std m³/min Vstd ~~799.573~~ 1086.15 std m³

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration ~~7.38~~ 5.43 TGW µg/std m³

Performed by: TGW Checked by: LBC

Project A142 Filter No. 14200 Sampler ID 131

Part A. Field Data (Vol. of air sampled)

Site #4 Date, on 10/15/93 off 10/21/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		36174.4	1.95
Start		35379.4	2.0
Total, Hrs.			
Mean		795	1.975

Sample Period: 10/15 - 10/16

Tav (Average Temp.) 8.4 °C 281.4 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~0.6685~~ 0.4906

b = ~~0.0595~~ 0.0611

r = 0.99933

Calib. Date: 7/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)$^{1/2}$-b} {1/m} Elapsed Time 795.0 min

$\overline{Qa}$ = ~~1.3455~~ 1.792 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period:

OK 1418

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6471	10/28/93	TGW
Tare	3.6396	9/28/93	LEC
Net (Wn)	0.0075	10/28/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav)

$\overline{Qstd}$ ~~1.5445~~ 1.569 std m^3/min

PM_{10} Concentration = (Wn)(10^6)/Vstd

Vstd = $\overline{(Qstd)}$(elapsed time)

Vstd ~~947.795~~ 1247.36 std m^3

PM_{10} Concentration ~~8.77~~ 6.01 TGW µg/std m^3

Performed by: TGW Checked by: LEC

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Project A142 Filter No. 11207 Sampler ID TSP-#1

Part A. Field Data (Vol. of air sampled)

Site #3 Date, on 10-15-93 off 10-21-9-

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		523968	1.95
Start		50976.8	1.95
Total, Hrs.			
Mean		1420	1.95

Sample Period: 10-15 to 10-16

Tav (Average Temp.) 8.4 °C 281.4 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~0.6536~~ 0.4798

b = ~~0.0477~~ 0.0497

r = 0.99975

Calib. Date: 7/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1470.0 min

$\overline{Qa}$ = ~~1.3564~~ 1.8441 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period:

On 1411

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6423	10/28/93	TGW
Tare	3.6318	9/28/93	LEC
Net (Wn)	0.0105	10/28/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd} = \overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ ~~1.1577~~ 1.1615 std m³/min Vstd ~~1656.530~~ 1293.3 std m³ TGW

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration ~~6.43~~ 4.58 µg/std m³

Performed by: TGW Checked by: LEC

Project A142 Filter No. 14205 Sampler ID TSP-5

Part A. Field Data (Vol. of air sampled)

Site #2 Date, on 10-8-93 off 10-9-93

Sample Period: 10/8 - 10/9

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		01275.5	5.7
Start		99826.8	5.9
Total, Hrs.		1448.7	
Mean			5.8

Tav (Average Temp.) 4.9 °C 277.9 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~1.1556~~ 0.9975

b = ~~0.1117~~ 0.1149

r = 0.99930

Calib. Date: 9/15/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav)]$^{1/2}$-b} {1/m} Elapsed Time 1448.7 min

$\overline{Qa}$ = ~~1.0470~~ 1.491 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Note: Flow unstable as indicated by Dickson 10/25/93 LEC

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6594	10/18/93	TGW
Tare	3.6471	9/28/93	LEC
Net (Wn)	0.0123	10/18/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav)

$\overline{Qstd}$ ~~0.9776~~ 1.312 std m³/min

PM_{10} Concentration = (Wn)(10^6)/Vstd

Vstd = $\overline{(Qstd)}$(elapsed time)

Vstd 1409.060 ~~1415.18~~ std m³

PM_{10} Concentration 8.73 ~~6.17~~ TGW µg/std m³

Performed by: TGW Checked by: LEC

Project A142 Filter No. 14204 Sampler ID TSP-3

Part A. Field Data (Vol. of air sampled)

Site 4 Date, on 10/8 off 10/9/9

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		35375.9	2.0
Start		339300	1.9
Total, Hrs.		1445.9	
Mean			1.95

Sample Period: 10/8 - 10/9

Tav (Average Temp.) 4.9 °C 277.9 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:
m = ~~0.6756~~ .6683 0.9
b = ~~0.0445~~ .0595 0.0
r = 0.99957 .99933

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1445.9 min

$\overline{Qa}$ = ~~1.3078~~ 1.765 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6616	10/28/93	TGW
Tare	3.6480	9/28/93	LEC
Net (Wn)	0.0136	10/28/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd} = \overline{Qa}$ (Pav/Pstd) (Tstd/Tav)

$\overline{Qstd}$ ~~1.5584~~ 1.565 std m³/min

PM_{10} Concentration = (Wn)(10^6)/Vstd

Vstd = $\overline{(Qstd)}$(elapsed time)

Vstd ~~1670.645~~ 1667.619 2267.7 std m³

PM_{10} Concentration ~~8.140~~ 6.00 µg/std m³

Performed by: TGW Checked by: LEC

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Project A142 Filter No. 14203 Sampler ID 1>1---1

Part A. Field Data (Vol. of air sampled)

Site #3 Date, on 10/8 off 10/9

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop			
Start			1.5
Total, Hrs.			
Mean			

Sample Period: 10/8 - 10/9

Tav (Average Temp.) 4.9 °C 277.9 °K

Pav (Average Barom. Press.) 628.41 mmHg

Sampler Calibration Relationship:

m = _____

b = _____

r = _____

Calib. Date: _____

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav]$^{1/2}$-b} {1/m} Elapsed Time _____ min

$\overline{Qa}$ = _____ m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

10-15-93 Power Chart Stopped only 2 Hrs;

Stopped manual reset from with Time [illegible]

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	—		
Tare	3.6448	9 28 93	LEC
Net (Wn)			

Part C. PM_{10} Calculations:

SAMPLE VOID
LEC 11/12/93

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = ($\overline{Qstd}$)(elapsed time)

$\overline{Qstd}$ _____ std m^3/min Vstd _____ std m^3

PM_{10} Concentration = (Wn)(10^6)/Vstd PM_{10} Concentration _____ µg/std m^3

Performed by: _____ Checked by: _____

FOR MFC SAMPLER

Project A142 Filter No. 14202 Sampler ID TSP-1

Part A. Field Data (Vol. of air sampled)

Site #3 Date, on 10/8 off 10/9/93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter 5-965.4	▲ P_m in. H_2O 1.8
Stop		5096.8	1.8
Start		4953.41	1.8
Total, Hrs.		1432.0	
Mean			1.8

Sample Period: 10/8 - 10/9

Tav (Average Temp.) 4.9 °C 277.9 °K

Pav (Average Barom. Press.) 628.4 mmHg

Sampler Calibration Relationship:

m = ~~0.6536~~ 0.4776

b = ~~0.0479~~ 0.0497

r = 0.99975

Calib. Date: 9/15/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ▲P_m (Tav)/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1432.0 min

$\overline{Qa}$ = ~~1.2998~~ 1.756 m³/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period: _____

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6604	10/28/93	TGW
Tare	3.6470	9/28/93	LEC
Net (Wn)	0.0134	10/28/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd}$ = $\overline{Qa}$ (Pav/Pstd) (Tstd/Tav) Vstd = $\overline{(Qstd)}$(elapsed time)

$\overline{Qstd}$ ~~1.1453~~ 1.557 std m³/min Vstd ~~1640.108~~ 2229.62 std m³

PM_{10} Concentration = (Wn)(10⁶)/Vstd PM_{10} Concentration ~~8177~~ 6016 TGW µg/std m³

Performed by: TGW Checked by: LEC

NAWC NORTH AMERICAN WEATHER CONSULTANTS · 1753 WEST 2200 SOUTH, SALT LAKE CITY, UTAH 84119 · (801) 972-2000

Project A142 Filter No. 14201 Sampler ID TSP-2.

Part A. Field Data (Vol. of air sampled)

Site #1 Date, on 10-8-93 off 10-9-93

	Sample Time		Sampler Manometer Readings
	Time Clock Setting	Elapsed Time Meter	ΔP_m in. H_2O
Stop		11191.3	5.9
Start		~~11738.5~~ 9738.5	5.6
Total, Hrs.		1452.8	
Mean			5.75

Sample Period: 10/8 - 10/9

Tav (Average Temp.) 4.9 °C 277.9 °K

Pav (Average Barom. Press.) 628.41 mmHg

Sampler Calibration Relationship:

m = ~~1.3765~~ 1.0105

b = ~~0.0299~~ 0.0137

r = .99987

Calib. Date: 9/13/93

Date of Quarterly Calibration Verification _____

$\overline{Qa}$ = {[mean ΔP_m (Tav/Pav]$^{1/2}$-b} {1/m} Elapsed Time 1452.8 min

$\overline{Qa}$ = ~~1.573~~ 1.565 m^3/min Where Tav = °K and Pav = mm Hg

Unusual activities or weather conditions near site (if any) during the sampling period:

DIXON RECORDER DID NOT ADVANCE

Performed by: _____ Checked by: _____

Part B. Filter Data (Mass)

	Weight, g	Date	Recorded by:
Final	3.6685	10/18/93	TGW
Tare	3.6564	9/28/93	LEC
Net (Wn)	0.0121	10/18/93	TGW

Part C. PM_{10} Calculations:

$\overline{Qstd} = \overline{Qa}$ (Pav/Pstd) (Tstd/Tav)

$\overline{Qstd}$ ~~1.4108~~ 1.397 std m^3/min

Vstd = $\overline{(Qstd)}$(elapsed time)

Vstd ~~1982.96~~ 2015.05 std m^3 TGW

PM_{10} Concentration = (Wn)(10^6)/Vstd

PM_{10} Concentration ~~8.16~~ 6.00 µg/std m^3

Performed by: TGW Checked by: LEC

APPENDIX G

Metal Analysis Results
from DataChem Laboratories

DATA CHEM LABORATORIES

ANALYTICAL REPORT

AMENDED

Date _____
Agency Identification Number 93-2960-EC
Account No. 03300

Montgomery-Watson
4525 Wasatch Blvd, Suite 200
Salt Lake City, UT 84124
Attention: Bryan Haymas

FAX (801) 272-0430
Telephone (801) 272-1900

Sampling Collection and Shipment

Sampling Site Tooele Army Depot Date of Collection _____

Date Samples Received at Laboratory November 19, 1993

Analysis

Method of Analysis EPA6010

Date(s) of Analysis December 12, 1993

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Arsenic µg/m³ 3050	Lead µg/m³ 3050	Selenium µg/m³ 3050	Thallium µg/m³ 3050	Cadmium µg/m³ 3050			
SITE #1 (A	CN 21655	FILTER	0.012	0.020	0.0036	ND*	(.00035)			
SITE #2 (A	CN 21656	FILTER	0.018	0.077	0.0041	ND*	(.00044)			
SITE #3 (A	CN 21657	FILTER	0.015	0.031	0.0035	ND*	(.00030)			
SITE #4 (A	CN 21658	FILTER	0.018	0.031	0.0045	ND*	(.00033)			
BLANK (A	CN 21659	FILTER	0.0052	0.013	0.0007	ND*	(.00013)			
Limit of Detection			.0003	.0001	.0002	.0004	.00003			
Limit of Quantitation			.0012	.00036	.00060	.0012	.00060			

* See comment on last page.
ND Parameter not detected.
NR Parameter not requested.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Analyst: Henry F. Lin

Reviewer: Michael E. Richmond

Laboratory Supervisor: Brent E. Stephens

DATA CHEM LABORATORIES

ANALYTICAL REPORT

AMENDED

Date _____

Agency Identification Number 93-2960-EC

General Set Comments

The limits of detection, quantitation, and the blank values were calculated using an average air volume of 10,000 m^3. All other concentration are based on calculations using each sample's own air volume.

This report has been amended in order to include an LOD (calculated from EPA CLP IDL's) and an LOQ (calculated from the CLP SOW CRDL's).

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547 / (801) 266-7700
A Sorenson Company

DATA CHEM LABORATORIES

ANALYTICAL REPORT

AMENDED

Date _____
Agency Identification Number 93-2960-DC
Account No. 03300

Montgomery-Watson
4525 Wasatch Blvd, Suite 200
Salt Lake City, UT 84124
Attention: Bryan Haymas

FAX (801) 272-0430
Telephone (801) 272-1900

Sampling Collection and Shipment

Sampling Site Tooele Army Depot Date of Collection _____

Date Samples Received at Laboratory November 19, 1993

Analysis

Method of Analysis 6010

Date(s) of Analysis December 13, 1993

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Aluminum µg/m³ 3050	Antimony µg/m³ 3050	Barium µg/m³ 3050	Beryllium µg/m³ 3050	Cadmium µg/m³ 3050	Calcium µg/m³ 3050	Chromium µg/m³ 3050	Cobalt µg/m³ 3050
SITE #1 (A	CN 21655	FILTER	1.4	ND*	1.9	ND*	0.00054)	2.7	0.0058	ND*
SITE #2 (A	CN 21656	FILTER	1.5	ND*	1.4	ND*	0.00093)	3.7	0.0079	ND*
SITE #3 (A	CN 21657	FILTER	1.1	ND*	1.3	ND*	0.00060)	2.5	0.0055	ND*
SITE #4 (A	CN 21658	FILTER	1.3	ND*	1.6	ND*	0.00052)	2.9	0.0065	ND*
BLANK (A	CN 21659	FILTER	0.53	ND*	0.25	ND*	ND*	1.5	0.0038	ND*
A Limit of Detection			0.005	0.005	0.0003	0.0003	0.0001	0.004	0.0008	0.0006
Limit of Quantitation			0.012	0.024	0.0024	0.0012	0.0012	0.012	0.0024	0.0024

* See comment on last page.
ND Parameter not detected.
NR Parameter not requested.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Analyst: Robert B. Copenhafer

Reviewer: John A. Burghard

Laboratory Supervisor: Brent S. Stephens

DATA CHEM LABORATORIES

ANALYTICAL REPORT

Form ARF-AL
Page 2 of 4
Part 2 of 3

AMENDED

Date
Agency Identification Number 93-2960-DC
Account No. 03300

Montgomery-Watson
4525 Wasatch Blvd, Suite 200
Salt Lake City, UT 84124
Attention: Bryan Haymas

FAX (801) 272-0430
Telephone (801) 272-1900

Sampling Collection and Shipment

Sampling Site Tooele Army Depot Date of Collection

Date Samples Received at Laboratory November 19, 1993

Analysis

Method of Analysis 6010

Date(s) of Analysis December 13, 1993

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Copper µg/m³ 3050	Iron µg/m³ 3050	Magnesium µg/m³ 3050	Manganese µg/m³ 3050	Nickel µg/m³ 3050	Potassium µg/m³ 3050	Silver µg/m³ 3050	Sodium µg/m³ 3050
SITE #1 (A	CN 21655	FILTER	0.17	0.37	0.68	0.0096	ND*	1.1	ND*	26.
SITE #2 (A	CN 21656	FILTER	0.21	0.84	0.91	0.023	(0.0031)	1.3	(0.00058)	31.
SITE #3 (A	CN 21657	FILTER	0.13	0.52	0.63	0.015	ND*	1.0	ND*	24.
SITE #4 (A	CN 21658	FILTER	0.15	0.57	0.75	0.015	ND*	1.2	ND*	30.
BLANK (A	CN 21659	FILTER	0.042	0.40	0.35	0.011	ND*	0.52	ND*	11.
* Limit of Detection			0.0008	0.002	0.005	0.0004	0.003	0.04	0.0005	0.01
Limit of Quantitation			0.0024	0.012	0.012	0.0012	0.0036	0.24	0.0024	0.024

* See comment on last page.
ND Parameter not detected.
NR Parameter not requested.

** See comment on last page.
( ) Parameter between LOD and LOQ.

DATA CHEM LABORATORIES

ANALYTICAL REPORT

AMENDED

Date

Agency Identification Number 93-2960-DC

Account No. 03300

Montgomery-Watson
4525 Wasatch Blvd, Suite 200
Salt Lake City, UT 84124
Attention: Bryan Haymas

FAX (801) 272-0430
Telephone (801) 272-1900

Sampling Collection and Shipment

Sampling Site Tooele Army Depot Date of Collection

Date Samples Received at Laboratory November 19, 1993

Analysis

Method of Analysis 6010

Date(s) of Analysis December 13, 1993

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Vanadium µg/m³ 3050	Zinc µg/m³ 3050
SITE #1 (A	CN 21655	FILTER	ND*	1.6
SITE #2 (A	CN 21656	FILTER	ND*	1.2
SITE #3 (A	CN 21657	FILTER	ND*	1.1
SITE #4 (A	CN 21658	FILTER	ND*	1.4
BLANK (A	CN 21659	FILTER	ND*	0.27
Limit of Detection			0.002	0.0006
Limit of Quantitation			0.0024	0.0024

* See comment on last page.
ND Parameter not detected.
NR Parameter not requested.

** See comment on last page.
( ) Parameter between LOD and LOQ.

DATA CHEM LABORATORIES

ANALYTICAL REPORT

AMENDED

Date _____

Agency Identification Number 93-2960-DC

General Set Comments

The limits of detection, quantitation, and the blank values were calculated using an average air volume of 10,000 m^3. All other results were calculated using each sample's respective air volume.

This report has been amended to include LOD's (calculated from August Battelle 6010 MDL's) and LOQ's (calculated from the ICP SW 6010 check table reporting limits).

Values between the LOD and LOQ are denoted by parentheses. However, due to limitation of characters avalable, only one parenthesis may show.

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A Sorenson Company

DATA CHEM LABORATORIES

ANALYTICAL REPORT

AMENDED

Date

Agency Identification Number 93-2960-FC

Account No. 03300

Montgomery-Watson
4525 Wasatch Blvd, Suite 200
Salt Lake City, UT 84124
Attention: Bryan Haymas

FAX (801) 272-0430
Telephone (801) 272-1900

Sampling Collection and Shipment

Sampling Site Tooele Army Depot Date of Collection November 19, 1993

Date Samples Received at Laboratory November 19, 1993

Analysis

Method of Analysis 7471(Mod)

Date(s) of Analysis December 02, 1993

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Mercury µg/m³
SITE #1 (A	CN 21655	FILTER	ND*
SITE #2 (A	CN 21656	FILTER	ND*
SITE #3 (A	CN 21657	FILTER	ND*
SITE #4 (A	CN 21658	FILTER	0.00007
BLANK (A	CN 21659	FILTER	ND*
* Limit of Detection			0.00006

* See comment on last page.
ND Parameter not detected.
NR Parameter not requested.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Analyst: Kristie F. Bitner

Reviewer: Michael E. Richmond

Laboratory Supervisor: Brent E. Stephens

DATA CHEM LABORATORIES

ANALYTICAL REPORT

AMENDED

Date _____

Agency Identification Number 93-2960-FC

General Set Comments

The LOD and blank are calculated using an average air volume of 10,000 m^3

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A Sorenson Company

DATA CHEM LABORATORIES

ANALYTICAL REPORT

AMENDED

Date _____
Agency Identification Number 93-3244-BC
Account No. 03300

Montgomery-Watson
4525 Wasatch Blvd, Suite 200
Salt Lake City, UT 84124
Attention: Bryan Haymas

FAX (801) 272-0430
Telephone (801) 272-1900

Sampling Collection and Shipment

Sampling Site _____ Date of Collection _____

Date Samples Received at Laboratory December 23, 1993

Analysis

Method of Analysis EPA 6010

Date(s) of Analysis January 20, 1994

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Arsenic µg/m³	Lead µg/m³	Selenium µg/m³	Thallium µg/m³	Cadmium µg/m³
AR-42-001	CN 24194	FILTER	0.012	0.024	0.0059	ND*	(.00037)
AR-42-002	CN 24195	FILTER	0.026	0.044	0.010	ND*	(.00044)
AR-42-003	CN 24196	FILTER	0.019	0.032	0.0074	ND*	(.00027)
AR-42-004	CN 24197	FILTER	0.028	0.034	0.011	ND*	(.00038)
AR-42-BLK-2	CN 24198	FILTER	(.00073)	0.0014	(.00025)	ND*	(.00009)
* Limit of Detection			0.0003	0.0001	0.0002	0.0004	0.00003
** Limit of Quantitation			0.0012	0.00036	0.00060	0.0012	0.00060

* See comment on last page.
ND Parameter not detected.
NR Parameter not requested.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Analyst: Jeannine M. Chan

Reviewer: Michael E. Richmond

Laboratory Supervisor: Brent E. Stephens

DATA CHEM LABORATORIES

ANALYTICAL REPORT

AMENDED

Date _____

Agency Identification Number 93-3244-BC

General Set Comments

The limits of detection, limits of quantitation, and the blank values were calculated using an average air volume of 10,000 m^3. All other concentrations are based on calculations using each sample's own air volume.

This report has been amended in order to include limits of detection (calculated from EPA CLP instrument detection limits) and limits of quantitation (calculated from the CLP SOW CRDL's).

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A Sorenson Company

DATA CHEM LABORATORIES

ANALYTICAL REPORT

FORM AR-AL

AMENDED

Date

Agency Identification Number 93-3244-CC

Account No. 03300

Montgomery-Watson
4525 Wasatch Blvd, Suite 200
Salt Lake City, UT 84124
Attention: Bryan Haymas

FAX (801) 272-0430
Telephone (801) 272-1900

Sampling Collection and Shipment

Sampling Site _____ Date of Collection December 23, 1993

Date Samples Received at Laboratory December 23, 1993

Analysis

Method of Analysis 7471(Mod)

Date(s) of Analysis January 04, 1994

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Mercury µg/m³
AR-42-001	CN 24194	FILTER	ND*
AR-42-002	CN 24195	FILTER	ND*
AR-42-003	CN 24196	FILTER	ND*
AR-42-004	CN 24197	FILTER	ND*
AR-42-BLK-2	CN 24198	FILTER	ND*
* Limit of Detection			0.00006

* See comment on last page.
ND Parameter not detected.
NR Parameter not requested.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Analyst: Kristie F. Bitner

Reviewer: Reza P. Charandabi

Laboratory Supervisor: Brent E. Stephens

DATA CHEM LABORATORIES

ANALYTICAL REPORT

AMENDED

Date _____

Agency Identification Number 93-3244-CC

General Set Comments

The LOD and blank are calculated using an average air volume of 10,000 m^3

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547 / (801) 266-7700
A Sorenson Company

DATA CHEM LABORATORIES

ANALYTICAL REPORT

AMENDED

Date _____
Agency Identification Number 93-3244-AC
Account No. 03300

Montgomery-Watson
4525 Wasatch Blvd, Suite 200
Salt Lake City, UT 84124
Attention: Bryan Haymas

FAX (801) 272-0430
Telephone (801) 272-1900

Sampling Collection and Shipment

Sampling Site _____ Date of Collection _____

Date Samples Received at Laboratory December 23, 1993

Analysis

Method of Analysis EPA 6010

Date(s) of Analysis February 01, 1994

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Aluminum µg/m³	Antimony µg/m³	Barium µg/m³	Beryllium µg/m³	Cadmium µg/m³	Calcium µg/m³	Chromium µg/m³	Cobalt µg/m³
AR-42-001	CN 24194	FILTER	0.60	ND*	0.31	ND*	ND*	2.7	0.0058	(0.0010)
AR-42-002	CN 24195	FILTER	0.48	ND*	0.18	ND*	ND*	2.2	0.0046	(0.00067)
AR-42-003	CN 24196	FILTER	0.42	ND*	0.28	ND*	ND*	1.7	0.0034	(0.0012)
AR-42-004	CN 24197	FILTER	0.43	ND*	0.16	ND*	ND*	1.9	0.0033	ND*
AR-42-BLK-2	CN 24198	FILTER	0.15	ND*	0.0026	ND*	ND*	0.94	(0.0020)	ND*
* Limit of Detection			0.005	0.005	0.0003	0.0003	0.0003	0.004	0.0008	0.0006*
Limit of Quantitation			0.012	0.024	0.0024	0.0012	0.0012	0.012	0.0024	0.0024

* See comment on last page.
ND Parameter not detected.
NR Parameter not requested.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Analyst: John A. Barghard

Reviewed: Robert B. Copenhafer

Laboratory Supervisor: Brent B. Stephens

DATA CHEM LABORATORIES

ANALYTICAL REPORT

AMENDED

Date _____
Agency Identification Number 93-3244-AC
Account No. 03300

Montgomery-Watson
4525 Wasatch Blvd, Suite 200
Salt Lake City, UT 84124
Attention: Bryan Haymas

FAX (801) 272-0430
Telephone (801) 272-1900

Sampling Collection and Shipment

Sampling Site _____ Date of Collection _____

Date Samples Received at Laboratory December 23, 1993

Analysis

Method of Analysis EPA 6010

Date(s) of Analysis February 01, 1994

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Copper µg/m³	Iron µg/m³	Magnesium µg/m³	Manganese µg/m³	Nickel µg/m³	Potassium µg/m³	Silver µg/m³	Sodium µg/m³
AR-42-001	CN 24194	FILTER	0.15	0.50	0.70	0.013	ND*	0.70	(0.0010)	21.
AR-42-002	CN 24195	FILTER	0.19	0.49	0.56	0.014	ND*	0.51	0.00088)	14.
AR-42-003	CN 24196	FILTER	0.080	0.40	0.45	0.012	ND*	0.47	0.00074)	13.
AR-42-004	CN 24197	FILTER	0.13	0.45	0.51	0.012	ND*	0.46	0.00090)	13.
AR-42-BLK-2	CN 24198	FILTER	0.0035	0.029	0.30	0.00097)	ND*	(0.22)	ND*	14.
Limit of Detection			0.0008	0.002	0.005	0.0004	0.003	0.04	0.0005	0.01
Limit of Quantitation			0.0024	0.012	0.012	0.0012	0.0036	0.24	0.0024	0.020

* See comment on last page.
ND Parameter not detected.
NR Parameter not requested.

** See comment on last page.
( ) Parameter between LOD and LOQ.

DATA CHEM LABORATORIES

ANALYTICAL REPORT

AMENDED

Date _____
Agency Identification Number 93-3244-AC
Account No. 03300

Montgomery-Watson
4525 Wasatch Blvd, Suite 200
Salt Lake City, UT 84124
Attention: Bryan Haymas

FAX (801) 272-0430
Telephone (801) 272-1900

Sampling Collection and Shipment

Sampling Site _____ Date of Collection _____

Date Samples Received at Laboratory December 23, 1993

Analysis

Method of Analysis EPA 6010

Date(s) of Analysis February 01, 1994

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Vanadium µg/m³	Zinc µg/m³
AR-42-001	CN 24194	FILTER	ND*	0.29
AR-42-002	CN 24195	FILTER	ND*	0.17
AR-42-003	CN 24196	FILTER	ND*	0.27
AR-42-004	CN 24197	FILTER	ND*	0.16
AR-42-BLK-2	CN 24198	FILTER	ND*	0.0049
Limit of Detection			0.002	0.0006
Limit of Quantitation			0.0024	0.0024

* See comment on last page.
ND Parameter not detected.
NR Parameter not requested.

** See comment on last page.
( ) Parameter between LOD and LOQ.

DATA CHEM LABORATORIES

ANALYTICAL REPORT

ED

Date _____

Agency Identification Number 93-3244-AC

General Set Comments

The limits of detection, quantitation, and the blank values were calculated using an average air volume of 10,000 m³. All other concentrations are based on calculations using each sample's own air volume.

This report has been amended in order to include an LOD (calculated from August Battelle 6010 MDLs) and an LOQ (calculated from the ICP 6010 check table reporting limits).

Values between the LOD and LOQ are denoted by parentheses. However, due to limitation of characters available, only one parenthesis may show.

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A Sorenson Company

APPENDIX H

WeatherPak Calibration Data

HORIZONTAL WIND DIRECTION AUDIT SHEET

NORTH AMERICAN WEATHER CONSULTANTS

Operator Tom W. | Date 7/14/93 | Start Time
Site Name NAWC office | Stn ID | Stop Time
Project AIR3 | Client

Sensor Mfg RM Young / coastal climate | WD Sensor Model 05305-AQ
Serial No. Boat #1 | WD Sensor Ht (m)
Crossarm Alignment | WD Sensor Range 0- 360 degrees
Site Declination — degrees
Last Calibration Date 5/24/93 | WD Shaft Rotational Torque 16 gm cm CCW 16 gm cm CW
Starting Threshold ~~0.4 m/s~~ 0.5 m/s

AUDIT INPUT (deg)	AUDIT INPUT (deg)	PRIMARY DAS RESPONSE DAS (v)	PRIMARY DAS RESPONSE DAS (deg)	PRIMARY DAS RESPONSE DIFF (deg)	BACKUP DAS RESPONSE DAS (v)	BACKUP DAS RESPONSE DAS (deg)	BACKUP DAS RESPONSE DIFF (deg)
North	0/360		0	0			
East	90/450		90	0			
South	180/540		179	-1			
West	270		271	+1			
North	0/360		0	0			
West	270		271	+1			
South	180/540		180	0			
East	90/450		90	0			

Audit Criteria: Alignment with true North: ± 5 degrees
Linearity Test ± 3 degrees
Starting Threshold: <= .5 m/s

NAWC Direction Table

WD Audit Device ~~RM Young~~
WD Audit Model ~~05~~
WD Audit Serial # | Comments Compass turned at L

Audited By TGW

HORIZONTAL WIND SPEED AUDIT SHEET

NORTH AMERICAN WEATHER CONSULTANTS

Operator Tom W.
Site Name NAWC Office
Project A113

Date 7/14/93 Start Time
Stn ID Stop Time
Client

Sensor Mfg R.M. Young / Coastal Climate
Serial No. BOH #1
Last Calibration Date 5/24/93

WS Sensor Model CS305-AQ
WS Sensor Ht (m)
WS Range 0 - 45 mps

WS Shaft Rotational Torque < 1.3 gm cm
Sensor Starting Threshold 0.4 m/s

AUDIT INPUT (rpm)	AUDIT INPUT (mps)	PRIMARY DAS RESPONSE DAS (v)	PRIMARY DAS RESPONSE DAS (mps)	PRIMARY DAS RESPONSE DIFF (mps)	BACKUP DAS RESPONSE DAS (v)	BACKUP DAS RESPONSE DAS (mps)	BACKUP DAS RESPONSE DIFF (mps)
2000	9.8	-	9.8	0			
4000	19.6		19.6	0			
6000	29.4	-	29.4	0			
0	0	-	0	0			

Audit Criteria: ± .25 m/s when wind speed <= 5 m/s
± 5% when ws > 5 m/s

WS Audit Device RM Young
WS Audit Model 55-1
WS Audit SER #

Comments

Audited By

STATION TEMPERATURE AUDIT SHEET

NORTH AMERICAN WEATHER CONSULTANTS

Operator Tom W. Date 7/14/93 Start Time

Site Name NAWC office Stn ID Stop Time

Project A113 Client

Sensor Mfg R M Young / coastal climate Sensor Model YSI 44203

Serial No. Boat #1

Range

Last Calibration Date 1/29/93

AUDIT INPUT (v)	AUDIT INPUT (°C)	PRIMARY DAS RESPONSE DAS (v)	PRIMARY DAS RESPONSE DAS (°C)	PRIMARY DAS RESPONSE DIFF (°C)	BACKUP DAS RESPONSE DAS (v)	BACKUP DAS RESPONSE DAS (°C)	BACKUP DAS RESPONSE DIFF (°C)
	21.8		21.8				
Audit Criteria:		± 1.0 °C					

Temperature Audit Device VWR Mercury Therm Comments

Temperature Audit Model ASTM 63C

Temperature Audit SER # A C5766

Audited By TGW

APPENDIX I

Hourly Meteorological Data

TOOELE ARMY DEPOT METEOROLOGICAL DATA

HOURLY AVERAGE DATA

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-10-05	13:00	5.0	196	13.0	26.9
93-10-05	14:00	6.4	196	11.5	27.1
93-10-05	15:00	5.5	183	12.4	26.8
93-10-05	16:00	4.8	243	17.5	24.9
93-10-05	17:00	3.8	58	15.5	22.0
93-10-05	18:00	5.9	126	15.2	20.9
93-10-05	19:00	6.4	176	7.2	18.7
93-10-05	20:00	6.8	176	8.3	17.4
93-10-05	21:00	4.4	158	13.0	15.0
93-10-05	22:00	2.0	185	14.6	14.3
93-10-05	23:00	3.9	185	9.6	14.8
93-10-06	00:00	4.3	187	6.8	15.0
93-10-06	01:00	5.6	187	7.5	15.5
93-10-06	02:00	6.4	176	6.4	14.3
93-10-06	03:00	6.5	186	6.5	14.0
93-10-06	04:00	6.5	187	6.3	13.6
93-10-06	05:00	6.4	187	6.1	13.4
93-10-06	06:00	6.5	194	6.8	13.5
93-10-06	07:00	6.4	194	7.4	12.5
93-10-06	08:00	6.7	194	7.2	12.6
93-10-06	09:00	6.8	197	7.2	13.6
93-10-06	10:00	7.9	166	9.4	15.0
93-10-06	11:00	7.4	148	8.8	16.0
93-10-06	12:00	7.0	181	9.9	16.9
93-10-06	13:00	5.6	196	9.6	18.1
93-10-06	14:00	7.5	208	7.7	17.9
93-10-06	15:00	6.4	204	8.8	16.8
93-10-06	16:00	6.0	193	8.6	17.2
93-10-06	17:00	5.5	193	8.0	16.5
93-10-06	18:00	3.8	175	9.2	15.7
93-10-06	19:00	3.8	180	9.6	15.2
93-10-06	20:00	4.8	176	9.2	15.0
93-10-06	21:00	4.1	189	7.9	14.8
93-10-06	22:00	4.2	191	7.6	13.9
93-10-07	23:00	5.3	187	7.2	14.2
93-10-07	00:00	3.1	149	15.7	14.2
93-10-07	01:00	2.2	129	24.3	13.8
93-10-07	02:00	2.5	134	10.6	13.0
93-10-07	03:00	3.3	190	7.4	12.3
93-10-07	04:00	4.8	194	6.9	11.5
93-10-07	05:00	2.0	179	30.5	12.2
93-10-07	06:00	1.5	188	13.8	11.1
93-10-07	07:00	2.5	194	7.8	10.6
93-10-07	08:00	2.0	215	13.7	10.8
93-10-07	09:00	2.2	229	12.1	10.0

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-10-07	10:00	1.7	12	28.2	11.1
93-10-07	11:00	4.4	206	10.9	12.1
93-10-07	12:00	3.3	206	11.6	13.1
93-10-07	13:00	1.6	259	18.7	12.9
93-10-07	14:00	2.4	0	12.6	12.7
93-10-07	15:00	3.8	17	9.8	12.3
93-10-07	16:00	3.7	21	8.1	10.0
93-10-07	17:00	2.9	55	9.3	9.7
93-10-07	18:00	1.6	36	23.6	9.4
93-10-07	19:00	4.7	40	13.6	6.5
93-10-07	20:00	3.9	63	13.2	6.2
93-10-07	21:00	3.0	96	13.8	5.7
93-10-07	22:00	2.7	80	11.0	5.7
93-10-07	23:00	1.8	218	12.2	4.9
93-10-08	00:00	1.1	220	13.8	4.6
93-10-08	01:00	1.7	149	9.9	4.2
93-10-08	02:00	1.0	152	31.0	3.9
93-10-08	03:00	2.6	176	10.0	3.7
93-10-08	04:00	4.0	192	7.5	3.3
93-10-08	05:00	3.9	190	7.4	3.0
93-10-08	06:00	2.4	185	8.9	2.4
93-10-08	07:00	2.6	192	9.7	3.2
93-10-08	08:00	2.2	206	13.7	3.9
93-10-08	09:00	1.4	174	16.9	4.5
93-10-08	10:00	3.1	0	10.3	5.6
93-10-08	11:00	3.0	31	12.3	6.5
93-10-08	12:00	2.0	40	18.9	7.4
93-10-08	13:00	2.7	89	12.4	7.4
93-10-08	14:00	1.9	69	27.0	6.2
93-10-08	15:00	1.4	20	23.2	7.8
93-10-08	16:00	1.6	331	23.0	9.0
93-10-08	17:00	1.1	258	26.2	9.2
93-10-08	18:00	1.0	252	15.4	8.6
93-10-08	19:00	0.9	221	25.8	6.4
93-10-08	20:00	1.4	157	12.6	4.6
93-10-08	21:00	2.0	168	5.2	4.8
93-10-08	22:00	1.3	171	11.9	4.8
93-10-08	23:00	0.9	125	16.7	3.5
93-10-09	00:00	0.7	116	20.9	3.5
93-10-09	01:00	1.4	185	5.2	3.7
93-10-09	02:00	2.6	182	7.4	2.7
93-10-09	03:00	4.1	196	6.8	2.0
93-10-09	04:00	4.1	179	7.9	2.5
93-10-09	05:00	4.1	188	7.5	1.9
93-10-09	06:00	4.0	196	8.2	2.1
93-10-09	07:00	4.8	198	6.9	2.7
93-10-09	08:00	4.5	200	10.1	3.0
93-10-09	09:00	4.2	195	9.3	3.5

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-10-09	10:00	4.4	199	10.7	4.9
93-10-09	11:00	3.4	200	8.1	5.4
93-10-09	12:00	1.6	281	19.0	6.5
93-10-09	13:00	1.6	350	19.8	7.6
93-10-09	14:00	1.2	36	24.8	8.5
93-10-09	15:00	1.2	101	41.5	11.3
93-10-09	16:00	3.3	219	12.2	11.2
93-10-09	17:00	1.8	246	10.6	10.6
93-10-09	18:00	0.8	271	19.6	8.9
93-10-09	19:00	1.9	139	7.0	6.0
93-10-09	20:00	1.8	124	6.1	4.8
93-10-09	21:00	2.4	157	4.0	5.6
93-10-09	22:00	3.1	172	7.2	5.4
93-10-09	23:00	5.1	185	5.9	6.1
93-10-10	00:00	5.4	188	5.9	6.2
93-10-10	01:00	5.0	195	6.3	4.9
93-10-10	02:00	5.5	197	6.3	5.6
93-10-10	03:00	3.1	172	9.0	4.5
93-10-10	04:00	1.8	156	10.4	3.0
93-10-10	05:00	1.5	186	10.9	1.3
93-10-10	06:00	1.9	173	9.6	0.9
93-10-10	07:00	4.4	185	8.2	3.8
93-10-10	08:00	4.6	195	7.2	4.0
93-10-10	09:00	5.5	192	7.5	4.2
93-10-10	10:00	5.8	197	7.6	7.1
93-10-10	11:00	5.8	204	7.7	9.4
93-10-10	12:00	3.7	212	11.9	12.4
93-10-10	13:00	1.9	196	31.0	14.2
93-10-10	14:00	1.0	272	55.8	16.3
93-10-10	15:00	2.6	306	27.1	16.3
93-10-10	16:00	2.7	347	13.2	14.5
93-10-10	17:00	2.2	330	12.8	14.4
93-10-10	18:00	1.3	310	7.1	13.3
93-10-10	19:00	1.6	136	8.5	10.1
93-10-10	20:00	2.5	130	3.0	7.8
93-10-10	21:00	2.0	138	6.1	7.6
93-10-10	22:00	1.2	134	18.0	7.7
93-10-10	23:00	2.1	167	16.8	8.5
93-10-11	00:00	2.2	177	19.0	7.8
93-10-11	01:00	1.8	161	15.1	7.0
93-10-11	02:00	1.9	178	11.2	6.1
93-10-11	03:00	2.0	181	17.4	6.4
93-10-11	04:00	2.4	191	13.7	7.8
93-10-11	05:00	2.6	173	11.0	9.2
93-10-11	06:00	4.1	171	11.4	9.2
93-10-11	07:00	5.3	180	10.7	10.3
93-10-11	08:00	6.2	184	9.8	10.5
93-10-11	09:00	5.4	183	11.3	11.7

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-10-11	10:00	7.8	190	8.7	11.3
93-10-11	11:00	7.8	169	8.8	11.2
93-10-11	12:00	6.1	168	14.6	12.2
93-10-11	13:00	6.6	209	9.8	13.8
93-10-11	14:00	7.7	188	10.5	16.0
93-10-11	15:00	6.7	187	11.3	15.7
93-10-11	16:00	6.5	186	10.6	16.4
93-10-11	17:00	6.1	180	8.4	15.8
93-10-11	18:00	4.0	251	19.0	13.4
93-10-11	19:00	3.4	33	9.3	11.0
93-10-11	20:00	2.3	46	8.6	10.5
93-10-11	21:00	1.0	39	11.7	10.5
93-10-11	22:00	1.2	308	15.1	9.9
93-10-11	23:00	1.2	351	12.3	9.9
93-10-12	00:00	0.6	149	27.4	10.0
93-10-12	01:00	0.8	316	19.1	10.1
93-10-12	02:00	0.6	194	31.4	9.1
93-10-12	03:00	1.0	173	13.4	9.1
93-10-12	04:00	1.2	94	27.7	9.4
93-10-12	05:00	3.1	64	6.8	10.0
93-10-12	06:00	2.2	55	10.7	10.0
93-10-12	07:00	0.9	203	19.3	9.4
93-10-12	08:00	1.1	213	16.5	9.4
93-10-12	09:00	1.5	209	11.0	9.6
93-10-12	10:00	1.2	360	25.2	11.5
93-10-12	11:00	2.4	27	14.0	12.1
93-10-12	12:00	2.6	40	13.6	12.6
93-10-12	13:00	2.6	4	16.2	12.8
93-10-12	14:00	2.1	356	22.0	13.4
93-10-12	15:00	2.2	351	22.3	13.8
93-10-12	16:00	2.1	10	22.3	14.0
93-10-12	17:00	2.3	12	9.4	13.1
93-10-12	18:00	2.2	25	5.6	12.2
93-10-12	19:00	1.2	49	7.0	10.7
93-10-12	20:00	1.6	157	7.4	9.3
93-10-12	21:00	2.2	133	4.6	8.1
93-10-12	22:00	2.2	175	8.1	7.8
93-10-12	23:00	2.5	167	10.4	8.3
93-10-13	00:00	2.8	176	11.9	7.9
93-10-13	01:00	3.7	179	8.7	7.4
93-10-13	02:00	3.7	188	12.3	7.4
93-10-13	03:00	4.1	181	6.4	7.2
93-10-13	04:00	4.6	192	7.7	5.9
93-10-13	05:00	4.5	194	6.9	6.5
93-10-13	06:00	5.1	193	6.8	5.9
93-10-13	07:00	6.1	194	6.8	5.9
93-10-13	08:00	5.7	190	7.0	7.1
93-10-13	09:00	7.5	199	6.6	7.6

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-10-13	10:00	7.5	197	7.2	8.2
93-10-13	11:00	6.6	202	6.8	9.8
93-10-13	12:00	5.0	192	7.7	13.3
93-10-13	13:00	3.6	40	16.9	13.7
93-10-13	14:00	3.3	6	11.6	13.1
93-10-13	15:00	2.1	358	14.8	12.9
93-10-13	16:00	0.9	323	26.5	13.3
93-10-13	17:00	0.7	347	15.6	13.1
93-10-13	18:00	0.9	347	7.0	11.7
93-10-13	19:00	1.2	120	8.3	10.0
93-10-13	20:00	1.4	116	7.7	10.2
93-10-13	21:00	2.5	61	8.5	10.4
93-10-13	22:00	2.5	37	13.8	10.9
93-10-13	23:00	2.8	349	10.0	8.8
93-10-14	00:00	3.2	64	11.5	8.2
93-10-14	01:00	3.5	124	10.8	8.2
93-10-14	02:00	3.0	216	13.3	8.4
93-10-14	03:00	2.3	212	24.1	8.2
93-10-14	04:00	1.7	146	37.7	8.7
93-10-14	05:00	0.9	179	16.2	8.2
93-10-14	06:00	1.1	328	16.1	7.7
93-10-14	07:00	2.5	204	7.8	6.7
93-10-14	08:00	2.7	174	10.1	6.8
93-10-14	09:00	4.4	196	6.6	7.8
93-10-14	10:00	3.4	209	8.9	8.7
93-10-14	11:00	1.4	248	24.9	11.1
93-10-14	12:00	1.3	16	32.5	12.9
93-10-14	13:00	1.0	336	46.2	13.8
93-10-14	14:00	1.6	356	25.8	13.9
93-10-14	15:00	1.8	25	26.7	14.6
93-10-14	16:00	1.6	12	21.3	14.3
93-10-14	17:00	1.4	243	24.8	14.5
93-10-14	18:00	0.5	347	33.8	13.4
93-10-14	19:00	1.0	233	18.2	10.9
93-10-14	20:00	1.7	163	7.4	9.5
93-10-14	21:00	1.6	155	6.7	9.6
93-10-14	22:00	1.4	169	20.8	10.4
93-10-14	23:00	2.0	146	6.6	9.3
93-10-15	00:00	4.2	199	6.6	9.2
93-10-15	01:00	5.6	192	6.6	8.7
93-10-15	02:00	4.6	184	8.6	8.6
93-10-15	03:00	4.5	193	7.7	8.3
93-10-15	04:00	3.0	174	18.1	8.4
93-10-15	05:00	2.2	192	12.6	8.3
93-10-15	06:00	1.9	185	17.5	7.6
93-10-15	07:00	2.0	193	24.1	6.9
93-10-15	08:00	2.1	106	11.4	6.9
93-10-15	09:00	1.8	199	20.7	7.1

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-10-15	10:00	3.4	139	7.3	7.2
93-10-15	11:00	4.2	181	10.4	8.6
93-10-15	12:00	5.5	180	12.0	9.5
93-10-15	13:00	5.8	191	9.6	11.1
93-10-15	14:00	5.9	201	8.4	10.7
93-10-15	15:00	4.9	199	8.4	11.5
93-10-15	16:00	4.1	208	7.8	11.4
93-10-15	17:00	4.3	202	6.8	11.6
93-10-15	18:00	3.0	179	9.3	10.5
93-10-15	19:00	3.3	183	7.4	9.0
93-10-15	20:00	5.1	187	7.2	7.7
93-10-15	21:00	5.6	192	6.8	7.8
93-10-15	22:00	5.2	181	8.7	7.4
93-10-15	23:00	5.4	190	8.4	8.9
93-10-16	00:00	2.6	232	14.4	8.0
93-10-16	01:00	0.8	213	9.1	7.8
93-10-16	02:00	0.4	246	10.6	7.4
93-10-16	03:00	1.4	14	7.6	7.0
93-10-16	04:00	1.3	23	7.1	6.8
93-10-16	05:00	3.0	345	8.7	6.5
93-10-16	06:00	0.9	84	13.4	5.9
93-10-16	07:00	0.9	137	12.5	5.8
93-10-16	08:00	0.9	200	14.7	6.0
93-10-16	09:00	0.6	254	21.5	7.3
93-10-16	10:00	2.4	204	10.4	8.2
93-10-16	11:00	3.7	214	9.3	9.0
93-10-16	12:00	2.6	263	21.1	10.2
93-10-16	13:00	2.0	12	19.6	10.5
93-10-16	14:00	2.9	318	12.8	10.3
93-10-16	15:00	2.4	335	15.4	10.6
93-10-16	16:00	2.8	12	15.1	10.8
93-10-16	17:00	2.1	351	13.1	10.6
93-10-16	18:00	2.1	351	9.1	9.5
93-10-16	19:00	1.6	65	4.7	8.2
93-10-16	20:00	0.8	80	14.4	7.3
93-10-16	21:00	0.8	83	5.8	7.0
93-10-16	22:00	1.0	109	7.6	6.9
93-10-16	23:00	1.1	138	5.6	6.6
93-10-17	00:00	1.7	126	3.2	6.4
93-10-17	01:00	1.6	134	3.6	6.2
93-10-17	02:00	1.8	134	3.0	6.1
93-10-17	03:00	1.7	160	4.5	5.9
93-10-17	04:00	1.7	180	6.0	6.4
93-10-17	05:00	1.5	181	5.3	6.1
93-10-17	06:00	1.2	178	6.4	6.7
93-10-17	07:00	1.0	200	7.6	6.5
93-10-17	08:00	0.4	250	12.2	6.9
93-10-17	09:00	1.2	13	11.9	7.3

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-10-17	10:00	2.0	25	9.5	7.5
93-10-17	11:00	2.8	12	8.9	7.6
93-10-17	12:00	2.9	332	9.2	7.2
93-10-17	13:00	1.1	301	25.8	7.1
93-10-17	14:00	3.3	321	8.0	8.2
93-10-17	15:00	2.9	331	9.6	8.7
93-10-17	16:00	2.0	3	25.9	8.5
93-10-17	17:00	2.6	139	16.4	6.9
93-10-17	18:00	3.3	117	14.0	5.7
93-10-17	19:00	4.0	199	10.3	5.6
93-10-17	20:00	4.1	204	8.1	5.5
93-10-17	21:00	2.8	197	10.0	5.5
93-10-17	22:00	1.9	161	8.7	5.7
93-10-17	23:00	1.0	155	10.4	5.6
93-10-18	00:00	3.7	193	6.7	5.8
93-10-18	01:00	2.9	193	6.5	5.6
93-10-18	02:00	1.0	165	10.7	5.6
93-10-18	03:00	0.5	340	25.5	5.9
93-10-18	04:00	1.3	25	11.0	6.2
93-10-18	05:00	1.8	43	7.3	6.5
93-10-18	06:00	2.0	28	7.0	6.5
93-10-18	07:00	1.4	10	8.2	6.4
93-10-18	08:00	1.0	31	13.3	6.1
93-10-18	09:00	1.3	330	8.3	6.7
93-10-18	10:00	2.6	34	7.8	7.5
93-10-18	11:00	3.1	32	11.7	8.7
93-10-18	12:00	3.1	35	14.8	9.6
93-10-18	13:00	3.3	11	15.1	10.5
93-10-18	14:00	3.7	4	14.5	10.9
93-10-18	15:00	3.9	8	13.2	11.2
93-10-18	16:00	3.5	10	11.9	11.4
93-10-18	17:00	3.4	30	8.4	11.1
93-10-18	18:00	2.2	56	4.8	9.7
93-10-18	19:00	1.6	91	8.3	7.8
93-10-18	20:00	1.1	174	7.6	7.1
93-10-18	21:00	1.7	139	3.6	6.7
93-10-18	22:00	1.0	117	21.4	5.2
93-10-18	23:00	1.4	102	5.0	5.7
93-10-19	00:00	1.4	152	12.3	5.6
93-10-19	01:00	2.4	129	3.8	3.9
93-10-19	02:00	2.3	129	3.6	3.5
93-10-19	03:00	2.1	123	4.7	3.4
93-10-19	04:00	2.2	129	4.7	2.6
93-10-19	05:00	1.4	117	4.5	3.0
93-10-19	06:00	2.1	125	3.3	2.7
93-10-19	07:00	2.3	141	6.5	2.1
93-10-19	08:00	1.2	170	12.1	2.8
93-10-19	09:00	1.8	208	7.5	5.6

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-10-19	10:00	2.0	222	9.1	7.9
93-10-19	11:00	1.1	230	36.7	10.0
93-10-19	12:00	1.7	347	23.1	11.2
93-10-19	13:00	2.7	357	23.6	11.3
93-10-19	14:00	3.1	22	15.8	11.3
93-10-19	15:00	2.3	4	22.7	11.8
93-10-19	16:00	1.7	22	32.5	12.7
93-10-19	17:00	1.4	26	18.2	12.8
93-10-19	18:00	1.2	84	10.9	11.6
93-10-19	19:00	2.4	140	4.8	7.9
93-10-19	20:00	1.8	141	8.2	7.6
93-10-19	21:00	1.5	135	16.6	6.2
93-10-19	22:00	1.4	160	13.2	5.5
93-10-19	23:00	1.8	154	11.1	5.1
93-10-20	00:00	2.1	140	11.6	5.0
93-10-20	01:00	1.7	151	9.6	5.4
93-10-20	02:00	1.6	126	9.0	5.1
93-10-20	03:00	1.8	154	8.6	4.3
93-10-20	04:00	2.3	156	4.7	5.0
93-10-20	05:00	2.4	150	8.5	4.3
93-10-20	06:00	1.9	169	13.9	3.9
93-10-20	07:00	2.0	188	7.7	2.8
93-10-20	08:00	2.3	196	5.5	3.7
93-10-20	09:00	3.6	206	6.3	4.8
93-10-20	10:00	3.8	200	7.3	7.6
93-10-20	11:00	3.9	204	9.2	9.7
93-10-20	12:00	3.0	219	15.9	11.5
93-10-20	13:00	2.8	325	20.6	12.2
93-10-20	14:00	2.5	344	21.0	12.2
93-10-20	15:00	2.9	351	16.3	12.3
93-10-20	16:00	3.2	8	12.4	12.0
93-10-20	17:00	2.6	6	10.2	11.6
93-10-20	18:00	1.8	13	8.7	9.9
93-10-20	19:00	1.8	88	5.5	7.6
93-10-20	20:00	1.5	140	9.1	5.8
93-10-20	21:00	1.8	145	6.8	5.6
93-10-20	22:00	1.5	145	21.8	5.6
93-10-20	23:00	3.1	186	9.6	4.9
93-10-21	00:00	2.7	184	8.4	4.2
93-10-21	01:00	2.1	177	10.1	3.5
93-10-21	02:00	2.3	170	12.6	3.4
93-10-21	03:00	1.5	169	13.0	2.7
93-10-21	04:00	2.3	192	7.4	2.0
93-10-21	05:00	5.4	190	8.2	2.4
93-10-21	06:00	5.1	187	8.0	1.8
93-10-21	07:00	2.6	192	11.9	2.1
93-10-21	08:00	3.6	200	7.6	3.0
93-10-21	09:00	5.5	198	7.6	5.8

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-10-21	10:00	4.2	200	12.2	7.3
93-10-21	12:00	2.0	25	17.8	12.4
93-10-21	13:00	2.6	21	16.2	13.0
93-10-21	14:00	3.3	352	11.2	12.9
93-10-21	15:00	2.5	354	13.9	12.5
93-10-21	16:00	1.8	9	11.4	12.1
93-10-21	17:00	1.5	340	9.3	11.5
93-10-21	18:00	1.6	48	4.5	10.1
93-10-21	19:00	1.7	108	6.1	8.6
93-10-21	20:00	1.4	142	10.0	8.2
93-10-21	21:00	1.7	147	6.6	7.5
93-10-21	22:00	2.1	133	4.1	7.7
93-10-21	23:00	2.1	142	7.9	7.4
93-10-22	00:00	1.4	162	12.4	6.5
93-10-22	01:00	1.7	176	18.0	6.5
93-10-22	02:00	1.3	156	13.7	6.2
93-10-22	03:00	2.6	181	5.8	6.2
93-10-22	04:00	2.7	170	10.1	6.8
93-10-22	05:00	1.4	150	26.3	7.9
93-10-22	06:00	1.4	180	17.9	5.7
93-10-22	07:00	2.0	155	13.1	6.0
93-10-22	08:00	3.1	192	11.5	7.0
93-10-22	09:00	5.3	201	7.0	8.5
93-10-22	10:00	4.0	209	17.3	10.5
93-10-22	11:00	3.5	204	9.3	11.7
93-10-22	12:00	2.2	217	18.7	14.0
93-10-22	13:00	2.5	351	19.8	14.1
93-10-22	14:00	1.4	344	32.6	15.4
93-10-22	15:00	2.4	6	16.4	15.1
93-10-22	16:00	2.3	357	13.1	15.0
93-10-22	17:00	2.2	12	9.7	14.8
93-10-22	18:00	1.6	24	6.3	12.8
93-10-22	19:00	1.0	118	13.8	10.8
93-10-22	20:00	1.7	143	5.0	9.8
93-10-22	21:00	2.0	135	3.9	9.2
93-10-22	22:00	2.6	132	3.4	7.6
93-10-22	23:00	2.0	162	7.8	7.6
93-10-23	00:00	1.9	176	6.5	6.2
93-10-23	01:00	2.5	179	5.7	5.3
93-10-23	02:00	2.0	172	6.6	5.3
93-10-23	03:00	2.1	169	5.3	5.6
93-10-23	04:00	1.7	169	8.2	5.9
93-10-23	05:00	2.1	179	7.2	4.8
93-10-23	06:00	2.2	176	4.2	3.9
93-10-23	07:00	2.0	172	5.9	3.0
93-10-23	08:00	2.5	171	5.5	4.2
93-10-23	09:00	4.1	191	6.8	8.8
93-10-23	10:00	5.5	197	6.5	9.5

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-10-23	11:00	5.6	200	6.5	11.4
93-10-23	12:00	4.0	204	9.0	14.3
93-10-23	13:00	1.9	247	37.3	16.5
93-10-23	14:00	3.5	353	12.8	15.8
93-10-23	15:00	2.3	7	15.0	16.0
93-10-23	16:00	2.3	356	14.2	16.2
93-10-23	17:00	2.3	7	8.5	15.0
93-10-23	18:00	1.9	45	5.9	12.4
93-10-23	19:00	1.3	160	11.8	9.7
93-10-23	20:00	1.9	137	5.3	9.2
93-10-23	21:00	2.6	138	3.7	8.5
93-10-23	22:00	2.6	138	6.9	7.8
93-10-23	23:00	2.0	169	10.5	7.6
93-10-24	00:00	4.2	184	6.6	7.0
93-10-24	01:00	3.4	181	8.1	6.8
93-10-24	02:00	3.9	194	5.9	5.9
93-10-24	03:00	4.6	192	9.3	6.6
93-10-24	04:00	6.8	191	6.2	6.5
93-10-24	05:00	3.6	183	13.6	5.7
93-10-24	06:00	2.3	165	10.7	4.5
93-10-24	07:00	2.2	172	8.6	4.8
93-10-24	08:00	5.8	194	6.2	6.9
93-10-24	09:00	6.1	189	7.1	7.7
93-10-24	10:00	5.1	192	8.3	9.1
93-10-24	11:00	2.4	220	17.7	12.8
93-10-24	12:00	2.5	33	17.5	15.6
93-10-24	13:00	3.2	1	13.0	15.9
93-10-24	14:00	2.0	345	18.6	16.6
93-10-24	15:00	3.6	353	13.5	16.6
93-10-24	16:00	2.8	10	12.3	15.6
93-10-24	17:00	2.1	18	7.5	14.9
93-10-24	18:00	1.1	14	14.0	12.6
93-10-24	19:00	1.8	141	4.2	11.1
93-10-24	20:00	1.4	130	9.1	10.6
93-10-24	21:00	1.8	82	8.4	10.5
93-10-24	22:00	1.7	126	16.0	8.9
93-10-24	23:00	2.1	145	6.5	8.2
93-10-25	00:00	2.5	136	3.9	8.1
93-10-25	01:00	1.9	131	8.5	7.7
93-10-25	02:00	1.7	175	7.2	7.0
93-10-25	03:00	2.2	145	6.4	7.2
93-10-25	04:00	2.6	133	3.4	6.1
93-10-25	05:00	1.8	134	9.1	5.7
93-10-25	06:00	1.4	152	9.1	4.9
93-10-25	07:00	2.0	156	6.4	5.2
93-10-25	08:00	2.2	138	3.4	5.7
93-10-25	09:00	0.7	161	22.8	8.9
93-10-25	10:00	1.6	2	17.2	11.1

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-10-25	11:00	2.8	352	14.7	11.7
93-10-25	12:00	3.4	9	14.4	12.2
93-10-25	13:00	3.3	3	14.0	12.7
93-10-25	14:00	2.6	7	18.3	13.5
93-10-25	15:00	3.2	16	14.9	13.7
93-10-25	16:00	3.9	9	11.2	13.2
93-10-25	17:00	2.9	20	8.1	12.4
93-10-25	18:00	2.2	41	4.9	9.7
93-10-25	19:00	1.2	140	11.2	7.6
93-10-25	20:00	2.1	123	3.4	7.0
93-10-25	21:00	1.7	98	15.0	8.1
93-10-25	22:00	1.3	41	17.5	7.0
93-10-25	23:00	1.8	77	13.4	6.5
93-10-26	00:00	1.5	101	8.7	5.5
93-10-26	01:00	1.8	144	7.5	4.8
93-10-26	02:00	1.2	113	16.1	4.6
93-10-26	03:00	1.5	120	9.9	4.2
93-10-26	04:00	1.3	77	26.7	3.3
93-10-26	05:00	1.1	86	16.0	3.7
93-10-26	06:00	1.4	137	9.4	3.2
93-10-26	07:00	1.9	150	7.4	2.6
93-10-26	08:00	1.6	165	10.5	2.7
93-10-26	09:00	1.1	187	25.1	5.5
93-10-26	10:00	2.2	348	18.0	7.8
93-10-26	11:00	3.9	357	13.2	8.2
93-10-26	13:00	5.5	358	11.6	9.1
93-10-26	14:00	5.3	357	11.4	9.6
93-10-26	15:00	5.3	358	11.7	10.0
93-10-26	16:00	4.9	359	11.7	9.8
93-10-26	17:00	4.3	14	7.7	9.3
93-10-26	18:00	2.2	48	7.9	7.4
93-10-26	19:00	1.4	6	15.9	5.8
93-10-26	20:00	1.9	128	9.5	4.1
93-10-26	21:00	2.6	130	3.9	2.5
93-10-26	22:00	2.1	138	5.9	3.6
93-10-26	23:00	2.1	147	6.7	4.3
93-10-27	00:00	2.6	142	4.9	4.2
93-10-27	01:00	3.0	185	8.7	3.9
93-10-27	02:00	2.6	165	6.4	2.9
93-10-27	03:00	1.9	140	12.8	2.3
93-10-27	04:00	2.6	168	5.5	3.4
93-10-27	05:00	4.3	198	6.0	1.3
93-10-27	06:00	3.7	183	6.7	1.9
93-10-27	07:00	2.5	165	9.0	1.5
93-10-27	08:00	1.7	190	8.1	0.1
93-10-27	09:00	1.8	191	7.9	3.0
93-10-27	10:00	4.6	204	6.1	5.3
93-10-27	11:00	5.2	203	7.1	7.7

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-10-27	12:00	4.7	210	10.6	9.7
93-10-27	13:00	1.6	185	29.9	12.0
93-10-27	14:00	1.1	284	30.1	12.8
93-10-27	15:00	0.9	2	30.6	13.2
93-10-27	16:00	0.7	351	42.7	13.0
93-10-27	17:00	2.0	13	8.6	11.0
93-10-27	18:00	1.6	56	8.3	8.4
93-10-27	19:00	1.7	111	20.4	7.0
93-10-27	20:00	3.6	180	17.3	7.5
93-10-27	21:00	5.6	186	8.2	7.4
93-10-27	22:00	6.4	184	7.0	7.0
93-10-27	23:00	7.6	190	7.2	5.9
93-10-28	00:00	8.3	194	6.7	5.6
93-10-28	01:00	8.5	197	7.3	5.6
93-10-28	02:00	8.3	195	6.9	5.9
93-10-28	03:00	8.1	195	6.9	5.4
93-10-28	04:00	8.1	196	6.4	4.7
93-10-28	05:00	9.0	197	7.1	4.3
93-10-28	06:00	8.3	197	8.0	4.3
93-10-28	07:00	7.8	194	6.9	4.3
93-10-28	08:00	7.8	193	6.3	5.5
93-10-28	09:00	7.9	198	6.5	5.8
93-10-28	10:00	6.2	196	6.6	7.1
93-10-28	11:00	5.7	197	7.3	10.1
93-10-28	12:00	2.9	200	8.4	11.4
93-10-28	13:00	2.7	44	16.2	13.6
93-10-28	14:00	4.1	23	9.8	12.8
93-10-28	15:00	4.3	7	15.1	11.7
93-10-28	16:00	5.1	353	10.4	10.3
93-10-28	17:00	2.9	38	8.2	8.6
93-10-28	18:00	1.9	38	9.3	8.3
93-10-28	19:00	1.6	55	6.4	7.9
93-10-28	20:00	1.5	26	10.4	7.4
93-10-28	21:00	2.0	75	5.6	7.0
93-10-28	22:00	2.0	63	6.5	7.0
93-10-28	23:00	1.2	314	18.3	6.5
93-10-29	00:00	1.6	62	18.3	6.8
93-10-29	01:00	2.8	54	8.5	6.2
93-10-29	02:00	0.9	10	20.5	5.4
93-10-29	03:00	3.4	16	9.1	5.3
93-10-29	04:00	2.9	34	7.6	4.1
93-10-29	05:00	3.1	44	7.7	3.5
93-10-29	06:00	2.7	24	13.0	3.4
93-10-29	07:00	2.9	17	7.0	2.7
93-10-29	08:00	3.4	54	9.3	2.7
93-10-29	09:00	4.2	32	7.2	3.7
93-10-29	10:00	5.7	22	6.5	3.5
93-10-29	11:00	5.8	24	8.2	4.0

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-10-29	12:00	4.6	17	12.1	5.1
93-10-29	13:00	5.4	16	10.4	5.4
93-10-29	14:00	4.7	8	13.0	5.6
93-10-29	15:00	4.8	14	13.2	5.5
93-10-29	16:00	4.4	12	11.5	5.6
93-10-29	17:00	3.7	23	7.3	5.1
93-10-29	18:00	2.5	68	4.8	3.0
93-10-29	19:00	2.3	81	6.8	1.9
93-10-29	20:00	2.0	94	13.5	1.5
93-10-29	21:00	1.2	109	8.4	0.1
93-10-29	22:00	1.2	122	12.1	0.4
93-10-29	23:00	2.0	120	5.0	0.7
93-10-30	00:00	1.9	162	9.9	-0.6
93-10-30	01:00	1.5	171	9.6	-0.9
93-10-30	02:00	2.2	187	9.7	-2.6
93-10-30	03:00	2.1	171	6.4	-3.2
93-10-30	04:00	2.3	169	7.1	-2.9
93-10-30	05:00	1.6	178	13.7	-3.9
93-10-30	06:00	3.4	185	8.1	-2.6
93-10-30	07:00	3.9	192	6.7	-3.3
93-10-30	08:00	3.3	179	6.4	-3.6
93-10-30	09:00	4.0	198	6.8	-0.7
93-10-30	10:00	7.1	199	6.7	-0.8
93-10-30	11:00	5.4	197	9.4	2.9
93-10-30	12:00	2.9	200	19.6	6.2
93-10-30	13:00	1.5	19	27.2	8.4
93-10-30	14:00	1.2	310	37.9	9.8
93-10-30	15:00	2.9	346	16.1	8.7
93-10-30	16:00	2.8	353	13.8	8.3
93-10-30	17:00	1.6	3	13.3	7.8
93-10-30	18:00	1.7	71	5.5	5.0
93-10-30	19:00	2.3	122	3.2	1.6
93-10-30	20:00	2.4	140	3.6	0.9
93-10-30	21:00	1.5	116	29.4	1.5
93-10-30	22:00	1.6	143	29.6	2.3
93-10-30	23:00	2.0	136	10.9	1.0
93-10-31	00:00	1.7	170	15.1	-0.6
93-10-31	01:00	1.7	166	11.8	-1.4
93-10-31	02:00	2.9	175	9.4	-0.4
93-10-31	03:00	2.4	183	10.1	-1.4
93-10-31	04:00	4.0	190	7.7	0.5
93-10-31	05:00	3.8	183	11.3	-0.2
93-10-31	06:00	4.2	198	10.1	-1.7
93-10-31	07:00	4.3	197	10.0	-0.6
93-10-31	08:00	3.4	189	8.9	-0.6
93-10-31	09:00	3.0	181	13.5	2.5
93-10-31	10:00	3.7	206	7.7	4.4
93-10-31	11:00	3.2	201	11.9	6.8

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-10-31	12:00	1.1	20	33.0	9.9
93-10-31	13:00	1.1	349	32.0	11.7
93-10-31	14:00	2.6	351	15.9	10.4
93-10-31	15:00	1.6	18	16.2	9.6
93-10-31	16:00	1.5	354	15.6	9.8
93-10-31	17:00	1.4	6	11.8	9.4
93-10-31	18:00	1.5	85	11.6	6.9
93-10-31	19:00	1.7	112	11.6	6.1
93-10-31	20:00	1.7	64	15.2	5.8
93-10-31	21:00	0.7	37	21.8	4.6
93-10-31	22:00	0.8	114	11.6	3.9
93-11-01	00:00	1.8	90	4.6	4.1
93-11-01	01:00	1.4	53	8.3	4.3
93-11-01	02:00	1.5	124	6.6	4.1
93-11-01	03:00	1.9	120	4.9	3.8
93-11-01	04:00	2.3	65	3.9	4.8
93-11-01	05:00	1.0	174	18.6	5.0
93-11-01	06:00	1.6	72	8.9	5.1
93-11-01	07:00	2.4	61	8.7	4.6
93-11-01	08:00	3.0	52	7.5	4.2
93-11-01	09:00	2.8	55	9.1	3.5
93-11-01	10:00	1.9	359	12.6	4.4
93-11-01	11:00	3.7	348	11.1	5.7
93-11-01	12:00	5.7	6	10.3	6.4
93-11-01	13:00	5.3	356	11.3	6.6
93-11-01	14:00	6.0	3	12.6	6.7
93-11-01	15:00	4.8	4	11.4	6.5
93-11-01	16:00	4.4	19	9.5	6.5
93-11-01	17:00	3.9	6	12.5	7.2
93-11-01	18:00	3.8	12	7.6	6.5
93-11-01	19:00	2.3	46	6.8	4.8
93-11-01	20:00	1.3	50	13.5	3.8
93-11-01	21:00	0.9	10	16.0	3.4
93-11-01	22:00	0.9	50	22.5	2.1
93-11-01	23:00	1.8	41	14.9	1.9
93-11-02	00:00	0.7	29	16.5	1.2
93-11-02	01:00	0.7	86	30.3	0.1
93-11-02	02:00	1.8	134	4.9	0.0
93-11-02	03:00	1.6	146	8.6	0.0
93-11-02	04:00	2.5	136	3.7	-0.9
93-11-02	05:00	2.6	131	3.3	-1.4
93-11-02	06:00	2.7	131	2.5	-2.3
93-11-02	07:00	2.4	137	5.8	-2.2
93-11-02	08:00	2.0	183	7.9	-2.4
93-11-02	09:00	4.5	199	6.1	-1.6
93-11-02	10:00	4.4	196	7.2	-0.7
93-11-02	11:00	3.5	204	6.6	2.7
93-11-02	12:00	3.4	205	7.9	5.5

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-02	18:00	2.0	11	13.0	8.6
93-11-02	19:00	0.8	345	16.7	6.7
93-11-02	20:00	2.2	134	4.8	3.6
93-11-02	21:00	2.2	148	10.1	4.0
93-11-02	22:00	5.3	193	8.6	4.5
93-11-02	23:00	6.4	193	7.3	4.6
93-11-03	00:00	7.2	195	7.0	3.3
93-11-03	01:00	6.2	185	7.0	3.9
93-11-03	02:00	5.9	186	7.3	4.2
93-11-03	03:00	7.6	192	7.0	3.3
93-11-03	04:00	8.3	195	6.4	1.6
93-11-03	05:00	8.2	195	7.5	1.8
93-11-03	06:00	8.9	196	6.5	2.6
93-11-03	07:00	9.2	201	6.5	1.4
93-11-03	08:00	10.7	201	6.5	0.0
93-11-03	09:00	9.1	188	7.6	1.5
93-11-03	10:00	9.9	198	7.2	2.5
93-11-03	11:00	10.2	200	7.1	3.8
93-11-03	12:00	6.6	157	17.1	6.9
93-11-03	13:00	3.1	78	20.5	9.9
93-11-03	14:00	6.3	194	7.5	13.0
93-11-03	15:00	5.8	187	8.0	13.2
93-11-03	16:00	5.2	185	7.2	13.3
93-11-03	17:00	4.3	188	7.3	13.6
93-11-03	18:00	3.7	207	9.2	13.0
93-11-03	19:00	1.5	11	19.1	9.0
93-11-03	20:00	1.7	229	27.9	9.1
93-11-03	21:00	1.4	108	21.9	8.7
93-11-03	22:00	1.5	155	16.0	8.2
93-11-03	23:00	2.8	89	9.4	8.5
93-11-04	00:00	2.5	139	18.9	10.0
93-11-04	01:00	2.5	224	22.5	12.3
93-11-04	02:00	2.3	232	26.3	11.4
93-11-04	03:00	4.7	356	12.2	8.1
93-11-04	04:00	2.7	24	14.2	6.4
93-11-04	05:00	4.0	331	9.4	5.3
93-11-04	06:00	4.9	341	10.3	5.1
93-11-04	07:00	3.4	331	11.5	4.2
93-11-04	08:00	3.1	330	8.0	2.7
93-11-04	09:00	2.6	30	14.6	1.4
93-11-04	10:00	2.7	53	14.3	2.8
93-11-04	11:00	2.6	49	19.3	4.1
93-11-04	12:00	2.1	38	24.5	4.2
93-11-04	13:00	2.1	356	28.1	5.7
93-11-04	14:00	2.7	349	22.3	5.8
93-11-04	15:00	2.7	343	19.0	6.2
93-11-04	16:00	3.0	356	20.1	6.3
93-11-04	17:00	3.0	5	14.8	6.1

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-04	18:00	2.8	15	9.1	5.4
93-11-04	19:00	2.1	42	5.3	2.9
93-11-04	20:00	2.4	95	4.0	1.0
93-11-04	21:00	1.4	120	28.0	0.7
93-11-04	22:00	0.6	110	25.4	0.0
93-11-04	23:00	2.1	131	4.2	-0.1
93-11-05	00:00	1.1	131	25.1	0.3
93-11-05	01:00	1.0	157	24.9	1.7
93-11-05	02:00	1.3	331	19.9	1.2
93-11-05	03:00	1.1	234	27.7	0.2
93-11-05	04:00	1.5	117	12.7	-0.4
93-11-05	05:00	1.6	63	13.0	-0.1
93-11-05	06:00	1.3	74	7.4	-0.1
93-11-05	07:00	1.3	46	12.8	0.4
93-11-05	08:00	1.3	52	11.5	0.2
93-11-05	09:00	1.6	59	7.3	0.1
93-11-05	10:00	1.3	42	16.7	0.6
93-11-05	11:00	1.3	46	22.4	1.4
93-11-05	12:00	2.1	18	19.8	2.2
93-11-05	13:00	3.1	9	14.9	2.6
93-11-05	14:00	3.4	13	14.2	3.4
93-11-05	15:00	4.0	27	12.3	3.3
93-11-05	16:00	3.7	17	12.5	3.9
93-11-05	17:00	3.8	13	10.1	4.0
93-11-05	18:00	3.0	23	7.0	3.5
93-11-05	19:00	2.1	67	3.6	1.2
93-11-05	20:00	2.2	165	6.8	-1.0
93-11-05	21:00	1.9	166	5.9	-1.6
93-11-05	22:00	2.4	149	4.6	-1.2
93-11-05	23:00	2.7	133	3.4	-2.2
93-11-06	00:00	2.3	187	8.7	-2.6
93-11-06	01:00	3.5	195	6.3	-2.8
93-11-06	02:00	3.9	195	5.5	-3.2
93-11-06	03:00	5.0	197	5.3	-3.0
93-11-06	04:00	5.2	195	5.7	-2.7
93-11-06	05:00	3.9	194	6.6	-3.8
93-11-06	06:00	4.2	200	5.5	-5.7
93-11-06	07:00	6.7	203	5.9	-5.3
93-11-06	08:00	6.4	197	7.1	-5.9
93-11-06	09:00	5.4	196	6.9	-5.7
93-11-06	10:00	6.0	195	6.9	-2.8
93-11-06	11:00	5.9	199	8.0	-0.6
93-11-06	12:00	6.0	203	6.9	1.0
93-11-06	13:00	5.3	204	9.1	3.3
93-11-06	14:00	3.2	204	16.8	5.2
93-11-06	15:00	1.4	329	27.2	6.8
93-11-06	16:00	1.5	7	29.3	7.6
93-11-06	17:00	3.6	347	14.2	5.9

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-06	18:00	1.9	353	10.5	5.1
93-11-06	19:00	1.4	67	10.9	2.2
93-11-06	20:00	2.5	117	4.4	-0.9
93-11-06	21:00	2.4	133	4.3	-0.6
93-11-06	22:00	2.0	144	10.0	-0.4
93-11-06	23:00	3.9	178	8.6	-0.2
93-11-07	00:00	6.9	198	5.8	-0.2
93-11-07	01:00	7.0	195	5.9	-1.9
93-11-07	02:00	3.8	185	7.2	-2.3
93-11-07	03:00	6.2	193	6.7	-2.5
93-11-07	04:00	6.9	197	6.0	-2.2
93-11-07	05:00	6.8	196	6.5	-2.8
93-11-07	06:00	2.1	149	20.0	-2.0
93-11-07	07:00	2.4	176	10.0	-3.5
93-11-07	08:00	3.5	186	8.1	-4.8
93-11-07	09:00	4.5	185	8.7	-2.5
93-11-07	10:00	5.5	193	7.4	-0.1
93-11-07	11:00	6.1	197	6.9	1.1
93-11-07	12:00	3.0	209	12.6	4.0
93-11-07	13:00	1.7	301	31.5	7.1
93-11-07	14:00	2.9	3	15.7	7.8
93-11-07	15:00	2.9	8	20.1	8.1
93-11-07	16:00	3.0	358	15.1	8.1
93-11-07	17:00	2.8	4	13.5	7.5
93-11-07	18:00	2.4	12	6.5	6.4
93-11-07	19:00	2.2	67	4.5	3.2
93-11-07	20:00	2.2	142	9.4	0.7
93-11-07	21:00	2.1	159	7.6	1.4
93-11-07	22:00	3.0	178	11.4	1.0
93-11-07	23:00	4.8	188	6.3	1.2
93-11-08	00:00	3.2	171	14.9	0.4
93-11-08	01:00	2.7	174	10.6	-1.1
93-11-08	02:00	2.6	141	4.2	-0.7
93-11-08	03:00	1.7	160	11.0	-2.3
93-11-08	04:00	2.6	179	5.1	-2.5
93-11-08	05:00	4.3	195	7.9	-2.4
93-11-08	06:00	4.6	193	7.4	-3.0
93-11-08	07:00	5.9	192	5.9	-1.2
93-11-08	08:00	6.4	189	7.3	-0.7
93-11-08	09:00	4.2	181	8.4	-1.1
93-11-08	10:00	5.5	194	7.9	1.3
93-11-08	11:00	4.3	200	6.6	2.4
93-11-08	12:00	3.8	209	7.0	4.3
93-11-08	14:00	2.1	10	18.7	8.8
93-11-08	15:00	2.5	359	19.0	9.4
93-11-08	16:00	1.8	9	21.4	9.9
93-11-08	17:00	2.6	2	10.9	8.8
93-11-08	18:00	1.3	14	9.3	6.4

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-08	19:00	1.2	151	8.9	4.2
93-11-08	20:00	2.0	135	5.2	2.2
93-11-08	21:00	2.7	158	7.8	1.8
93-11-08	22:00	4.0	169	9.9	2.2
93-11-08	23:00	6.0	188	6.5	4.1
93-11-09	00:00	5.9	186	6.2	3.2
93-11-09	01:00	5.4	193	5.4	2.1
93-11-09	02:00	5.3	191	6.2	0.0
93-11-09	03:00	3.1	115	17.8	1.6
93-11-09	04:00	2.0	169	13.0	-1.3
93-11-09	05:00	1.9	186	12.0	-2.8
93-11-09	06:00	2.6	165	10.4	-3.4
93-11-09	07:00	2.4	162	11.5	-2.4
93-11-09	08:00	2.6	168	12.4	-2.8
93-11-09	09:00	5.8	190	7.9	0.5
93-11-09	10:00	6.4	194	7.2	1.2
93-11-09	11:00	6.6	199	7.6	2.0
93-11-09	12:00	3.8	204	13.6	5.3
93-11-09	13:00	1.4	280	43.8	8.7
93-11-09	14:00	2.3	21	17.6	9.4
93-11-09	15:00	3.0	12	13.4	9.4
93-11-09	16:00	1.9	356	14.3	9.3
93-11-09	17:00	1.7	354	10.3	7.9
93-11-09	18:00	1.3	76	6.7	6.7
93-11-09	19:00	2.1	103	7.8	4.6
93-11-09	20:00	1.7	172	14.9	5.6
93-11-09	21:00	4.7	178	9.0	8.0
93-11-09	22:00	2.7	175	28.9	7.0
93-11-09	23:00	5.8	187	11.1	7.6
93-11-10	00:00	2.0	163	45.0	6.8
93-11-10	01:00	3.0	155	32.4	6.4
93-11-10	02:00	2.8	158	29.1	6.7
93-11-10	03:00	3.3	144	30.9	6.5
93-11-10	04:00	4.3	180	15.4	6.4
93-11-10	05:00	3.0	163	33.6	6.0
93-11-10	06:00	3.4	162	24.0	6.3
93-11-10	07:00	4.3	181	20.2	5.5
93-11-10	08:00	5.3	174	9.0	5.8
93-11-10	09:00	5.2	194	8.6	5.0
93-11-10	10:00	2.2	170	37.1	6.1
93-11-10	11:00	1.9	343	16.6	6.4
93-11-10	12:00	1.7	335	16.7	6.6
93-11-10	13:00	1.9	337	14.5	6.8
93-11-10	14:00	1.3	335	25.0	7.4
93-11-10	15:00	0.8	332	36.1	8.2
93-11-10	16:00	1.5	338	15.1	8.1
93-11-10	17:00	1.5	337	11.4	7.6
93-11-10	18:00	1.1	13	12.1	6.5

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-10	19:00	1.9	122	4.6	4.3
93-11-10	20:00	2.2	127	4.1	3.3
93-11-10	21:00	2.8	132	3.8	3.1
93-11-10	22:00	2.2	130	4.8	3.7
93-11-10	23:00	2.3	142	6.6	2.7
93-11-11	00:00	2.1	143	9.2	3.1
93-11-11	01:00	1.2	166	27.7	2.4
93-11-11	02:00	3.0	160	14.5	4.9
93-11-11	03:00	1.6	131	28.7	3.8
93-11-11	04:00	2.7	184	14.7	4.6
93-11-11	05:00	3.2	82	18.7	5.5
93-11-11	06:00	1.9	227	19.1	2.7
93-11-11	07:00	1.1	234	35.4	2.9
93-11-11	08:00	1.0	182	28.9	2.7
93-11-11	09:00	2.3	254	26.9	5.1
93-11-11	10:00	2.0	32	14.1	4.8
93-11-11	11:00	1.8	303	28.9	5.3
93-11-11	12:00	2.8	335	15.6	6.2
93-11-11	13:00	1.9	314	15.0	6.0
93-11-11	14:00	2.0	334	13.1	5.9
93-11-11	15:00	2.6	358	12.9	5.7
93-11-11	16:00	2.5	358	11.9	6.2
93-11-11	17:00	2.6	0	9.6	5.8
93-11-11	18:00	2.2	13	7.0	5.4
93-11-11	19:00	2.0	51	5.6	4.8
93-11-11	20:00	1.6	46	7.3	4.9
93-11-11	21:00	1.0	292	11.3	4.1
93-11-11	22:00	2.5	70	9.6	5.7
93-11-11	23:00	2.3	52	7.1	6.2
93-11-12	00:00	2.4	17	9.1	5.1
93-11-12	01:00	2.8	37	6.2	4.5
93-11-12	02:00	3.0	64	5.8	4.3
93-11-12	03:00	2.8	74	7.9	4.1
93-11-12	04:00	3.1	69	8.2	4.3
93-11-12	05:00	2.8	69	5.9	3.6
93-11-12	06:00	2.1	65	6.3	3.8
93-11-12	07:00	1.8	68	6.9	3.6
93-11-12	08:00	1.4	164	14.9	2.1
93-11-12	09:00	1.5	183	9.9	1.1
93-11-12	10:00	1.3	191	9.4	2.5
93-11-12	11:00	1.3	215	12.9	3.9
93-11-12	12:00	1.6	329	22.4	5.6
93-11-12	13:00	2.8	355	11.8	5.3
93-11-12	14:00	2.2	11	11.7	5.5
93-11-12	15:00	2.0	14	19.1	6.1
93-11-12	16:00	2.9	13	12.9	6.0
93-11-12	17:00	3.0	18	8.9	5.5
93-11-12	18:00	2.6	29	6.6	5.0

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-12	19:00	1.9	56	7.3	4.5
93-11-12	20:00	1.2	43	17.3	4.3
93-11-12	21:00	0.4	298	20.8	3.4
93-11-12	22:00	0.8	68	15.7	3.0
93-11-12	23:00	1.3	54	20.2	2.6
93-11-13	00:00	1.7	53	13.2	2.5
93-11-13	01:00	2.0	63	6.7	2.6
93-11-13	02:00	1.8	67	7.8	2.3
93-11-13	03:00	1.7	60	5.6	2.2
93-11-13	04:00	2.2	70	5.4	1.5
93-11-13	05:00	2.0	66	5.0	0.9
93-11-13	06:00	1.7	62	7.2	1.0
93-11-13	07:00	1.4	97	4.8	0.5
93-11-13	08:00	2.0	88	6.5	-0.6
93-11-13	09:00	2.4	83	4.6	-0.9
93-11-13	10:00	1.9	66	8.5	0.8
93-11-13	11:00	2.6	36	12.2	2.7
93-11-13	12:00	2.4	9	19.6	3.4
93-11-13	13:00	3.4	351	14.4	3.7
93-11-13	14:00	2.5	12	18.9	4.1
93-11-13	15:00	2.3	11	21.3	4.7
93-11-13	16:00	2.4	3	20.6	4.8
93-11-13	17:00	3.9	25	11.3	4.1
93-11-13	18:00	4.3	355	8.1	3.1
93-11-13	19:00	2.7	52	6.5	1.4
93-11-13	20:00	2.6	16	11.4	1.8
93-11-13	21:00	3.6	13	11.0	0.9
93-11-13	22:00	2.3	38	9.7	-0.7
93-11-13	23:00	3.1	47	7.6	-0.4
93-11-14	00:00	2.4	59	9.7	-0.1
93-11-14	01:00	1.9	15	9.1	0.0
93-11-14	02:00	1.5	33	9.1	-0.2
93-11-14	03:00	2.6	12	9.1	0.0
93-11-14	04:00	2.4	17	8.0	-0.3
93-11-14	05:00	2.8	351	9.4	-0.5
93-11-14	06:00	1.9	320	8.7	-0.8
93-11-14	07:00	1.1	33	19.2	-1.0
93-11-14	08:00	2.0	335	10.2	-0.7
93-11-14	09:00	2.4	327	7.7	-0.2
93-11-14	10:00	2.6	345	8.0	0.0
93-11-14	11:00	1.6	55	11.8	0.9
93-11-14	12:00	3.6	16	13.0	2.6
93-11-14	13:00	5.2	9	9.3	2.8
93-11-14	14:00	4.8	358	12.7	3.6
93-11-14	15:00	4.5	348	13.5	3.8
93-11-14	16:00	3.8	347	12.9	4.2
93-11-14	17:00	3.2	353	12.1	4.6
93-11-14	18:00	4.2	348	8.9	3.8

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-14	19:00	1.3	67	16.9	1.6
93-11-14	20:00	1.1	156	21.8	0.4
93-11-14	21:00	1.6	127	19.1	-0.1
93-11-14	22:00	1.3	54	19.1	-0.1
93-11-14	23:00	1.5	102	10.8	-1.7
93-11-15	00:00	2.2	107	3.9	-2.3
93-11-15	01:00	1.8	81	6.4	-1.8
93-11-15	02:00	1.6	80	10.9	-2.5
93-11-15	03:00	1.7	51	8.8	-3.6
93-11-15	04:00	2.0	98	6.3	-3.7
93-11-15	05:00	2.4	139	6.3	-4.8
93-11-15	06:00	2.0	146	7.9	-4.2
93-11-15	07:00	1.3	168	8.0	-5.1
93-11-15	08:00	1.7	167	8.0	-6.2
93-11-15	09:00	1.7	176	10.2	-6.9
93-11-15	10:00	1.5	198	6.4	-5.0
93-11-15	11:00	2.3	212	7.2	-1.3
93-11-15	12:00	1.5	232	29.9	2.0
93-11-15	13:00	0.9	232	39.2	4.8
93-11-15	14:00	1.4	326	29.6	5.1
93-11-15	15:00	2.8	359	21.5	4.9
93-11-15	16:00	2.3	8	16.6	4.2
93-11-15	17:00	1.4	338	19.1	5.0
93-11-15	18:00	2.7	4	8.2	3.2
93-11-15	19:00	1.8	66	3.8	-0.2
93-11-15	20:00	2.2	155	4.4	-1.0
93-11-15	21:00	2.1	144	6.8	-1.5
93-11-15	22:00	1.6	134	14.0	-1.6
93-11-15	23:00	2.8	173	9.8	-1.5
93-11-16	00:00	3.6	190	7.4	-2.1
93-11-16	01:00	3.7	192	6.9	-2.9
93-11-16	02:00	4.5	190	8.5	-2.6
93-11-16	03:00	5.0	196	7.5	-2.4
93-11-16	04:00	4.1	181	9.5	-2.0
93-11-16	05:00	3.2	168	18.9	-1.9
93-11-16	06:00	2.4	175	15.4	-2.0
93-11-16	07:00	4.3	188	9.6	-2.9
93-11-16	08:00	5.7	193	8.3	-1.7
93-11-16	09:00	5.9	188	8.2	-2.3
93-11-16	10:00	4.2	192	8.3	-0.6
93-11-16	11:00	6.8	194	6.9	-0.3
93-11-16	12:00	6.0	191	8.6	1.3
93-11-16	13:00	3.9	192	15.7	4.8
93-11-16	14:00	1.3	57	32.7	7.7
93-11-16	15:00	1.8	347	25.7	8.9
93-11-16	16:00	3.1	345	12.9	7.9
93-11-16	17:00	2.1	347	13.5	7.2
93-11-16	18:00	1.5	5	8.3	6.1

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-16	19:00	1.5	76	7.7	2.7
93-11-16	20:00	2.1	120	5.3	0.1
93-11-16	21:00	1.6	136	12.3	0.9
93-11-16	22:00	2.4	155	13.7	1.2
93-11-16	23:00	2.0	144	16.2	0.3
93-11-17	00:00	1.9	128	14.5	0.1
93-11-17	01:00	2.3	169	17.3	-0.1
93-11-17	02:00	2.5	176	12.2	-0.3
93-11-17	03:00	2.7	185	11.3	-0.8
93-11-17	04:00	1.6	183	18.4	-0.5
93-11-17	05:00	1.6	133	15.6	-0.2
93-11-17	06:00	2.1	172	22.2	0.2
93-11-17	07:00	3.6	180	13.1	0.9
93-11-17	08:00	4.9	194	8.5	1.2
93-11-17	09:00	5.3	192	8.5	1.4
93-11-17	10:00	6.0	190	10.5	2.8
93-11-17	11:00	6.7	199	9.0	3.3
93-11-17	12:00	6.0	198	9.5	5.0
93-11-17	13:00	5.4	194	12.9	8.0
93-11-17	14:00	6.3	186	12.6	11.0
93-11-17	15:00	5.7	179	14.1	11.2
93-11-17	16:00	4.1	159	31.3	10.3
93-11-17	17:00	5.7	174	15.0	10.9
93-11-17	18:00	2.1	343	27.6	6.4
93-11-17	19:00	2.0	162	16.0	4.3
93-11-17	20:00	2.1	186	11.8	4.8
93-11-17	21:00	4.3	194	8.4	6.3
93-11-17	22:00	4.6	195	6.6	5.3
93-11-17	23:00	5.2	193	6.2	5.2
93-11-18	00:00	5.5	193	5.9	4.4
93-11-18	01:00	5.1	193	6.6	4.6
93-11-18	02:00	5.0	194	6.6	5.3
93-11-18	03:00	5.0	200	6.4	5.6
93-11-18	04:00	5.9	198	6.7	5.6
93-11-18	05:00	5.5	198	6.4	4.5
93-11-18	06:00	5.6	196	6.8	4.8
93-11-18	07:00	6.4	196	7.0	5.2
93-11-18	08:00	5.9	190	7.6	5.4
93-11-18	09:00	5.0	187	6.9	5.9
93-11-18	10:00	4.4	196	9.2	6.1
93-11-18	11:00	2.5	4	11.7	5.1
93-11-18	12:00	3.1	38	10.6	6.2
93-11-18	13:00	2.8	44	12.1	5.5
93-11-18	14:00	2.7	74	14.9	5.1
93-11-18	15:00	5.5	335	12.3	5.3
93-11-18	16:00	6.8	352	9.4	3.6
93-11-18	17:00	5.7	345	10.2	2.2
93-11-18	18:00	5.0	1	8.9	1.8

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-18	19:00	4.3	2	9.9	0.4
93-11-18	20:00	3.6	357	10.2	-0.7
93-11-18	21:00	3.0	335	7.8	-1.9
93-11-18	22:00	2.9	346	10.7	-2.7
93-11-18	23:00	1.8	62	13.9	-3.3
93-11-19	00:00	1.6	139	8.9	-4.6
93-11-19	01:00	1.7	131	9.2	-5.4
93-11-19	02:00	2.3	151	7.0	-5.7
93-11-19	03:00	1.9	122	5.6	-5.3
93-11-19	04:00	1.0	115	9.9	-4.5
93-11-19	05:00	0.9	112	12.7	-5.3
93-11-19	06:00	1.5	152	9.4	-5.4
93-11-19	07:00	1.6	150	9.1	-7.0
93-11-19	08:00	1.7	162	9.6	-6.9
93-11-19	09:00	1.8	165	15.2	-6.7
93-11-19	10:00	2.8	190	8.4	-6.3
93-11-19	11:00	4.8	200	6.5	-3.9
93-11-19	12:00	3.3	206	10.2	-0.9
93-11-19	13:00	1.6	235	23.8	1.2
93-11-19	14:00	2.5	8	22.9	1.9
93-11-19	15:00	3.3	4	13.7	1.7
93-11-19	16:00	3.1	6	14.9	1.7
93-11-19	17:00	2.5	359	14.9	1.6
93-11-19	18:00	1.9	8	8.3	0.7
93-11-19	19:00	2.0	62	5.2	-1.8
93-11-19	20:00	2.2	88	4.9	-3.3
93-11-19	21:00	1.6	157	7.7	-4.1
93-11-19	22:00	2.2	136	3.5	-4.0
93-11-19	23:00	2.4	142	6.1	-4.3
93-11-20	00:00	1.6	166	8.8	-5.3
93-11-20	01:00	2.3	171	7.3	-4.7
93-11-20	02:00	2.3	173	7.1	-5.7
93-11-20	03:00	2.3	175	8.9	-7.2
93-11-20	04:00	2.9	182	6.0	-6.9
93-11-20	05:00	4.5	189	7.2	-6.7
93-11-20	06:00	3.5	183	8.1	-6.7
93-11-20	07:00	1.9	163	9.1	-6.9
93-11-20	08:00	1.8	169	9.8	-7.2
93-11-20	09:00	2.1	189	8.4	-8.1
93-11-20	10:00	5.6	194	6.5	-5.5
93-11-20	11:00	5.3	198	8.5	-3.2
93-11-20	12:00	4.7	196	8.1	-0.7
93-11-20	16:00	2.7	346	13.2	3.1
93-11-20	17:00	1.6	321	15.3	3.6
93-11-20	18:00	1.2	349	14.0	3.0
93-11-20	19:00	2.0	75	8.1	-0.6
93-11-20	20:00	2.0	131	3.9	-2.2
93-11-20	21:00	1.7	166	16.0	-3.1

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-20	22:00	1.9	179	24.9	-1.4
93-11-20	23:00	2.8	168	10.3	-1.7
93-11-21	00:00	1.8	142	19.1	-1.3
93-11-21	01:00	1.9	153	25.6	-2.5
93-11-21	02:00	2.7	177	9.2	-3.9
93-11-21	03:00	3.0	173	14.2	-4.3
93-11-21	04:00	5.3	188	8.1	-3.8
93-11-21	05:00	5.3	189	7.2	-3.9
93-11-21	06:00	5.9	189	8.9	-3.0
93-11-21	07:00	7.3	181	7.7	-1.2
93-11-21	08:00	4.4	174	18.6	-1.6
93-11-21	09:00	1.8	145	24.7	-1.9
93-11-21	10:00	6.1	191	10.2	-1.1
93-11-21	11:00	3.8	146	27.4	1.5
93-11-21	12:00	1.5	55	26.1	3.8
93-11-21	13:00	2.3	98	43.9	5.9
93-11-21	14:00	4.1	287	19.5	6.9
93-11-21	15:00	1.7	325	15.3	3.6
93-11-21	16:00	1.9	347	16.0	3.6
93-11-21	17:00	2.3	7	11.3	2.9
93-11-21	18:00	1.3	358	12.2	1.6
93-11-21	19:00	1.3	54	11.3	0.5
93-11-21	20:00	2.7	20	14.2	0.8
93-11-21	21:00	3.5	203	29.0	3.3
93-11-21	22:00	2.6	56	43.2	5.2
93-11-21	23:00	7.1	188	8.1	9.0
93-11-22	00:00	5.4	148	14.1	9.7
93-11-22	01:00	6.8	154	14.5	9.0
93-11-22	02:00	9.8	170	8.6	11.4
93-11-22	03:00	11.6	165	8.0	10.4
93-11-22	04:00	11.1	166	8.9	8.5
93-11-22	05:00	10.3	160	7.9	7.4
93-11-22	06:00	8.6	162	8.0	6.5
93-11-22	07:00	7.6	175	7.4	6.2
93-11-22	08:00	8.0	190	7.1	5.7
93-11-22	09:00	7.4	191	6.7	5.2
93-11-22	10:00	7.3	179	6.9	4.6
93-11-22	11:00	6.0	180	7.3	4.8
93-11-22	12:00	5.2	179	7.7	5.9
93-11-22	13:00	5.4	175	7.9	6.8
93-11-22	14:00	5.0	177	10.0	7.0
93-11-22	15:00	6.3	172	8.9	6.5
93-11-22	16:00	5.7	185	7.5	6.1
93-11-22	17:00	8.0	183	7.4	6.8
93-11-22	18:00	7.9	172	8.4	7.7
93-11-22	19:00	8.6	174	9.3	8.3
93-11-22	20:00	11.0	170	8.5	8.5
93-11-22	21:00	11.8	171	8.1	8.6

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-22	22:00	11.9	169	8.0	8.6
93-11-22	23:00	7.9	228	12.7	6.8
93-11-23	00:00	5.5	35	9.8	-0.3
93-11-23	01:00	5.8	73	8.1	-2.1
93-11-23	02:00	4.6	69	7.3	-2.6
93-11-23	03:00	4.6	86	8.9	-2.5
93-11-23	04:00	3.8	73	10.5	-1.9
93-11-23	05:00	3.6	49	7.8	-1.5
93-11-23	06:00	4.1	24	6.1	-3.1
93-11-23	07:00	2.5	45	9.7	-3.2
93-11-23	08:00	1.4	87	21.4	-2.9
93-11-23	09:00	2.6	164	19.9	-2.2
93-11-23	10:00	2.7	219	11.9	-1.4
93-11-23	11:00	3.2	277	10.5	-1.9
93-11-23	12:00	3.8	348	10.9	-2.9
93-11-23	13:00	2.6	38	11.3	-1.6
93-11-23	14:00	3.3	37	14.8	-0.7
93-11-23	15:00	2.5	48	19.6	-0.8
93-11-23	16:00	1.3	53	24.9	-1.6
93-11-23	17:00	3.4	3	9.8	-2.2
93-11-23	18:00	3.6	346	9.8	-2.6
93-11-23	19:00	3.1	1	8.6	-3.2
93-11-23	20:00	3.4	353	8.7	-3.9
93-11-23	21:00	2.0	333	10.4	-4.2
93-11-23	22:00	1.2	127	12.7	-5.0
93-11-23	23:00	1.4	160	6.9	-5.5
93-11-24	00:00	0.9	134	16.1	-5.7
93-11-24	01:00	1.1	74	16.9	-6.7
93-11-24	02:00	0.6	93	29.8	-6.7
93-11-24	03:00	0.8	314	28.3	-6.2
93-11-24	04:00	2.2	314	12.6	-6.3
93-11-24	05:00	2.7	303	11.9	-7.0
93-11-24	06:00	1.9	64	11.3	-8.4
93-11-24	07:00	1.0	78	21.0	-9.2
93-11-24	08:00	2.1	74	10.6	-10.0
93-11-24	09:00	2.1	74	10.7	-9.9
93-11-24	10:00	2.5	78	9.2	-8.7
93-11-24	11:00	2.9	54	8.5	-6.2
93-11-24	12:00	1.7	70	27.1	-4.5
93-11-24	13:00	1.5	129	26.7	-3.3
93-11-24	14:00	1.8	34	23.1	-3.3
93-11-24	15:00	1.1	350	38.7	-2.0
93-11-24	16:00	0.9	61	19.5	-2.0
93-11-24	17:00	2.2	25	18.5	-3.2
93-11-24	18:00	1.8	45	7.2	-4.6
93-11-24	19:00	1.9	27	8.6	-5.9
93-11-24	20:00	3.3	23	7.2	-5.7
93-11-24	21:00	3.5	6	10.4	-6.7

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-24	22:00	3.4	8	8.4	-7.8
93-11-24	23:00	3.1	5	7.4	-8.4
93-11-25	00:00	3.1	2	8.0	-9.1
93-11-25	01:00	3.1	349	9.4	-9.6
93-11-25	02:00	2.5	345	10.5	-10.4
93-11-25	03:00	2.0	347	15.2	-10.9
93-11-25	04:00	1.7	63	19.3	-12.1
93-11-25	05:00	3.4	9	8.5	-11.2
93-11-25	06:00	2.1	13	11.6	-11.3
93-11-25	07:00	1.7	14	10.8	-12.1
93-11-25	08:00	1.5	53	8.9	-12.5
93-11-25	09:00	2.2	76	6.8	-13.4
93-11-25	10:00	1.6	78	11.2	-12.9
93-11-25	11:00	0.6	74	25.8	-8.9
93-11-25	12:00	1.5	261	9.4	-8.5
93-11-25	13:00	0.8	46	15.0	-5.8
93-11-25	14:00	1.6	4	9.8	-7.3
93-11-25	15:00	1.6	333	9.2	-7.4
93-11-25	16:00	0.3	251	12.1	-4.2
93-11-25	17:00	0.9	41	10.4	-5.4
93-11-25	18:00	1.3	48	8.6	-8.9
93-11-25	19:00	2.1	127	2.9	-12.4
93-11-25	20:00	2.6	118	3.6	-15.6
93-11-25	21:00	3.0	132	3.3	-14.7
93-11-25	22:00	2.6	156	5.3	-13.0
93-11-25	23:00	2.9	161	9.4	-12.7
93-11-26	00:00	3.5	170	9.2	-12.2
93-11-26	01:00	3.8	178	6.7	-12.3
93-11-26	02:00	2.3	153	8.8	-13.6
93-11-26	03:00	2.0	152	9.6	-15.1
93-11-26	04:00	2.2	174	8.5	-15.1
93-11-26	05:00	1.7	153	7.5	-16.1
93-11-26	06:00	2.6	187	6.5	-17.0
93-11-26	07:00	4.6	197	5.8	-15.2
93-11-26	08:00	5.7	192	5.1	-15.2
93-11-26	09:00	7.4	196	5.6	-15.6
93-11-26	10:00	6.0	191	6.3	-13.5
93-11-26	11:00	5.2	191	5.8	-11.0
93-11-26	12:00	3.2	195	6.8	-9.0
93-11-26	13:00	3.4	200	6.0	-7.6
93-11-26	14:00	1.1	302	19.2	-4.4
93-11-26	15:00	1.4	17	9.8	-3.9
93-11-26	16:00	2.4	17	6.3	-5.1
93-11-26	17:00	1.2	18	7.0	-4.4
93-11-26	18:00	1.3	33	8.3	-6.1
93-11-26	19:00	1.8	107	5.1	-9.1
93-11-26	20:00	3.1	133	2.6	-11.7
93-11-26	21:00	2.0	124	14.5	-11.1

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-26	22:00	2.3	118	10.7	-10.9
93-11-26	23:00	2.5	142	5.2	-11.2
93-11-27	00:00	2.2	164	10.6	-10.9
93-11-27	01:00	3.1	182	8.7	-12.0
93-11-27	02:00	6.4	191	5.3	-12.4
93-11-27	03:00	5.0	186	9.5	-11.5
93-11-27	04:00	5.5	187	7.4	-11.0
93-11-27	05:00	4.7	180	7.8	-10.8
93-11-27	06:00	5.6	192	7.8	-9.9
93-11-27	07:00	5.2	184	8.6	-10.8
93-11-27	08:00	4.7	189	7.4	-10.8
93-11-27	09:00	6.2	185	7.9	-12.5
93-11-27	10:00	6.5	193	7.3	-13.2
93-11-27	11:00	5.4	192	6.5	-11.6
93-11-27	12:00	3.0	203	5.8	-7.7
93-11-27	13:00	1.2	273	12.6	-3.7
93-11-27	14:00	0.9	219	23.1	-0.8
93-11-27	15:00	0.9	15	23.9	0.2
93-11-27	16:00	2.3	36	8.6	-1.1
93-11-27	17:00	0.8	346	14.5	-1.1
93-11-27	18:00	1.1	8	14.9	-3.5
93-11-27	19:00	1.5	101	11.0	-6.6
93-11-27	20:00	2.2	123	4.4	-7.6
93-11-27	21:00	1.7	144	10.9	-7.5
93-11-27	22:00	1.8	170	10.7	-7.2
93-11-27	23:00	3.6	176	9.9	-6.1
93-11-28	00:00	2.6	172	18.5	-5.6
93-11-28	01:00	2.5	191	20.1	-5.9
93-11-28	02:00	1.3	162	15.5	-7.8
93-11-28	03:00	2.1	170	9.8	-8.0
93-11-28	04:00	2.4	191	20.4	-6.8
93-11-28	05:00	2.2	182	9.2	-7.5
93-11-28	06:00	0.9	178	19.6	-8.1
93-11-28	07:00	1.9	140	11.5	-7.9
93-11-28	08:00	5.7	192	8.2	-6.3
93-11-28	09:00	2.9	183	17.0	-6.0
93-11-28	10:00	2.0	196	28.3	-6.2
93-11-28	11:00	2.8	187	15.4	-5.5
93-11-28	12:00	1.5	1	18.2	-1.9
93-11-28	13:00	2.2	18	13.3	-0.6
93-11-28	14:00	1.7	358	10.7	-2.2
93-11-28	15:00	1.0	346	12.6	-0.8
93-11-28	16:00	0.8	300	14.9	-1.6
93-11-28	17:00	1.3	354	10.1	-2.3
93-11-28	18:00	0.8	345	24.5	-2.5
93-11-28	19:00	1.4	202	14.8	-2.9
93-11-28	20:00	2.1	133	31.1	-3.1
93-11-28	21:00	2.0	182	27.3	-2.8

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-28	22:00	2.1	106	33.0	-1.5
93-11-28	23:00	1.6	174	14.8	-4.7
93-11-29	00:00	1.7	150	8.5	-5.0
93-11-29	01:00	1.7	172	20.2	-4.3
93-11-29	02:00	2.0	185	21.9	-3.3
93-11-29	03:00	1.9	132	16.6	-3.1
93-11-29	04:00	2.0	71	37.5	-2.0
93-11-29	05:00	1.2	102	36.7	-2.3
93-11-29	06:00	1.1	131	29.3	-3.6
93-11-29	07:00	1.6	128	13.4	-4.4
93-11-29	08:00	1.9	140	10.3	-4.9
93-11-29	09:00	2.5	138	4.6	-5.5
93-11-29	10:00	1.4	131	7.5	-3.6
93-11-29	11:00	0.7	198	8.7	-0.1
93-11-29	12:00	0.4	343	23.2	3.1
93-11-29	13:00	0.2	321	27.1	6.0
93-11-29	14:00	1.1	5	12.7	4.7
93-11-29	15:00	1.0	7	11.7	3.8
93-11-29	16:00	1.2	355	10.3	3.6
93-11-29	17:00	0.3	16	14.6	4.1
93-11-29	18:00	0.9	153	22.1	1.5
93-11-29	19:00	1.7	151	10.2	-0.2
93-11-29	20:00	1.1	65	33.0	0.7
93-11-29	21:00	0.8	287	26.0	0.5
93-11-29	22:00	1.3	208	34.9	1.1
93-11-29	23:00	1.7	207	26.4	2.3
93-11-30	00:00	1.3	179	21.9	1.0
93-11-30	01:00	3.1	10	16.2	0.4
93-11-30	02:00	2.5	349	35.0	-0.5
93-11-30	03:00	2.8	13	21.6	-1.9
93-11-30	04:00	1.3	11	41.1	-2.1
93-11-30	05:00	1.8	153	27.3	-2.5
93-11-30	06:00	1.6	163	21.6	-1.1
93-11-30	07:00	2.0	152	17.3	1.5
93-11-30	08:00	3.7	188	8.4	4.0
93-11-30	09:00	3.9	220	10.5	4.2
93-11-30	10:00	2.8	4	12.0	1.5
93-11-30	11:00	1.9	324	15.4	-0.1
93-11-30	12:00	0.9	222	23.9	0.0
93-11-30	13:00	1.0	280	17.2	1.6
93-11-30	14:00	2.4	334	9.0	1.4
93-11-30	15:00	2.1	360	8.7	1.1
93-11-30	16:00	2.4	34	10.2	1.3
93-11-30	17:00	2.0	24	8.2	1.9
93-11-30	18:00	2.2	356	7.1	1.0
93-11-30	19:00	2.9	66	7.1	0.8
93-11-30	20:00	3.0	55	12.1	1.5
93-11-30	21:00	1.8	42	10.7	1.1

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-11-30	22:00	1.5	13	8.1	0.9
93-11-30	23:00	1.6	42	6.5	0.2
93-12-01	00:00	0.8	87	14.2	-0.6
93-12-01	01:00	0.6	82	13.0	-0.6
93-12-01	02:00	1.1	112	9.0	-0.5
93-12-01	03:00	2.2	125	3.8	-3.4
93-12-01	04:00	2.2	150	6.2	-4.0
93-12-01	05:00	1.6	180	10.9	-4.6
93-12-01	06:00	2.3	186	7.0	-5.0
93-12-01	07:00	5.5	191	6.1	-4.1
93-12-01	08:00	3.4	186	9.7	-4.5
93-12-01	09:00	4.4	188	7.7	-4.3
93-12-01	10:00	6.7	195	6.4	-4.2
93-12-01	11:00	5.1	196	6.7	-3.5
93-12-01	12:00	7.9	200	5.9	-2.4
93-12-01	13:00	7.8	199	6.5	0.2
93-12-01	14:00	5.7	181	13.1	3.0
93-12-01	15:00	2.4	134	33.0	4.8
93-12-01	16:00	4.8	208	6.8	5.2
93-12-01	17:00	4.3	208	7.5	5.3
93-12-01	18:00	1.5	26	30.3	3.0
93-12-01	19:00	1.3	104	38.4	1.1
93-12-01	20:00	4.0	172	12.1	0.9
93-12-01	21:00	6.5	184	7.4	1.0
93-12-01	22:00	8.1	193	6.7	0.4
93-12-01	23:00	8.6	203	6.3	0.2
93-12-02	00:00	4.5	175	20.1	0.9
93-12-02	01:00	6.4	192	11.8	2.9
93-12-02	02:00	5.9	194	9.7	3.7
93-12-02	03:00	6.4	191	7.7	0.4
93-12-02	04:00	7.4	192	7.8	-0.1
93-12-02	05:00	7.1	198	6.5	-0.3
93-12-02	06:00	6.3	191	9.5	0.7
93-12-02	07:00	6.2	194	7.6	0.3
93-12-02	08:00	3.4	197	16.3	1.9
93-12-02	09:00	4.0	22	10.9	-0.2
93-12-02	10:00	2.7	89	12.4	-0.4
93-12-02	11:00	2.0	87	16.9	0.6
93-12-02	12:00	1.8	57	12.3	2.7
93-12-02	15:00	4.0	4	11.9	3.3
93-12-02	16:00	3.1	23	9.7	3.6
93-12-02	17:00	2.6	59	11.2	3.0
93-12-02	18:00	1.6	75	13.4	3.0
93-12-02	19:00	2.6	88	5.1	0.3
93-12-02	20:00	2.4	113	5.2	-0.9
93-12-02	21:00	2.0	143	11.5	-3.3
93-12-02	22:00	2.1	95	13.4	-2.4
93-12-02	23:00	2.7	88	4.5	-1.7

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-12-03	00:00	2.3	189	7.6	-3.4
93-12-03	01:00	2.1	145	6.8	-4.5
93-12-03	02:00	2.3	127	6.1	-4.2
93-12-03	03:00	2.0	157	9.3	-3.7
93-12-03	04:00	1.6	172	9.5	-5.4
93-12-03	05:00	1.7	154	8.7	-4.8
93-12-03	06:00	1.8	169	11.0	-6.2
93-12-03	07:00	1.7	176	11.8	-7.5
93-12-03	08:00	1.8	171	20.8	-6.4
93-12-03	09:00	2.1	181	9.8	-7.4
93-12-03	10:00	2.0	184	10.1	-6.5
93-12-03	11:00	3.7	205	5.6	-2.7
93-12-03	12:00	3.7	204	5.8	-0.8
93-12-03	13:00	3.3	197	7.4	0.9
93-12-03	14:00	3.4	203	6.6	2.4
93-12-03	15:00	1.8	92	16.5	4.6
93-12-03	16:00	2.3	49	9.0	4.9
93-12-03	17:00	2.6	28	6.6	3.6
93-12-03	18:00	1.1	349	12.7	1.3
93-12-03	19:00	1.8	149	7.0	-0.6
93-12-03	20:00	2.2	171	8.7	-0.2
93-12-03	21:00	5.1	190	6.2	-0.3
93-12-03	22:00	5.6	193	6.6	-1.2
93-12-03	23:00	6.4	188	7.8	-1.3
93-12-04	00:00	6.7	189	6.6	-0.9
93-12-04	01:00	6.8	192	7.1	-0.8
93-12-04	02:00	7.4	188	7.3	-0.9
93-12-04	03:00	6.5	185	11.9	-1.4
93-12-04	04:00	6.9	191	10.4	-1.1
93-12-04	05:00	4.4	195	13.2	-0.3
93-12-04	06:00	5.9	186	13.4	-0.7
93-12-04	07:00	7.3	198	10.0	-0.5
93-12-04	08:00	7.0	196	16.9	-0.1
93-12-04	09:00	9.5	200	7.9	0.1
93-12-04	10:00	4.3	248	26.0	1.0
93-12-04	11:00	2.9	10	35.5	2.0
93-12-04	12:00	5.3	215	22.9	4.9
93-12-04	13:00	3.3	37	27.8	2.4
93-12-04	14:00	4.8	220	14.5	6.6
93-12-04	15:00	7.3	273	10.2	4.2
93-12-04	16:00	3.9	244	12.1	4.1
93-12-04	17:00	4.0	280	10.1	4.7
93-12-04	18:00	4.2	330	10.6	3.6
93-12-04	19:00	2.2	77	15.7	2.1
93-12-04	20:00	2.4	71	14.0	2.4
93-12-04	21:00	2.2	71	8.8	2.0
93-12-04	22:00	2.8	59	8.7	1.9
93-12-04	23:00	4.2	22	8.2	0.2

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-12-05	00:00	2.6	65	8.0	0.0
93-12-05	01:00	2.4	65	8.2	-0.3
93-12-05	02:00	2.7	63	6.5	-1.1
93-12-05	03:00	2.6	78	5.9	-2.2
93-12-05	04:00	2.6	72	7.7	-2.2
93-12-05	05:00	1.9	76	13.2	-2.2
93-12-05	06:00	1.1	104	31.0	-2.6
93-12-05	07:00	1.8	188	17.3	-4.0
93-12-05	08:00	1.6	163	10.0	-5.0
93-12-05	09:00	2.9	188	9.3	-5.1
93-12-05	10:00	3.6	191	7.1	-4.1
93-12-05	11:00	4.6	201	6.6	-3.3
93-12-05	12:00	5.2	203	6.7	-2.6
93-12-05	13:00	5.0	202	5.8	-1.9
93-12-05	14:00	4.1	200	13.0	-0.4
93-12-05	15:00	2.2	161	18.6	0.6
93-12-05	16:00	1.5	36	10.9	0.9
93-12-05	17:00	2.5	43	6.6	0.5
93-12-05	18:00	2.1	25	7.5	-0.2
93-12-05	19:00	1.0	177	11.2	-1.4
93-12-05	20:00	1.1	146	5.4	-1.9
93-12-05	21:00	1.4	138	5.0	-2.2
93-12-05	22:00	1.2	137	5.2	-2.4
93-12-05	23:00	1.0	156	6.9	-2.0
93-12-06	00:00	0.6	199	17.6	-1.9
93-12-06	01:00	0.9	170	36.7	-2.1
93-12-06	02:00	0.6	141	23.9	-2.4
93-12-06	03:00	0.9	138	22.1	-2.6
93-12-06	04:00	2.2	171	17.6	-2.4
93-12-06	05:00	4.3	190	8.5	-1.5
93-12-06	06:00	5.2	169	8.1	-1.1
93-12-06	07:00	3.7	308	18.1	-1.3
93-12-06	08:00	1.5	291	28.9	-2.3
93-12-06	09:00	1.7	180	19.6	-3.2
93-12-06	10:00	2.6	123	11.2	-1.2
93-12-06	11:00	3.4	233	13.0	0.6
93-12-06	12:00	2.5	21	20.8	-0.3
93-12-06	13:00	1.1	217	32.2	1.3
93-12-06	14:00	2.6	254	25.9	5.7
93-12-06	15:00	1.8	314	23.6	7.1
93-12-06	16:00	2.2	317	24.3	7.0
93-12-06	17:00	2.3	344	13.9	1.9
93-12-06	18:00	1.5	142	31.5	0.1
93-12-06	19:00	1.5	349	14.8	-1.2
93-12-06	20:00	1.1	142	17.3	-1.9
93-12-06	21:00	2.1	107	11.2	-0.5
93-12-06	22:00	2.4	69	10.4	1.6
93-12-06	23:00	0.9	69	22.7	0.0

DATE YY-MM-DD	TIME (HOUR ENDING	WIND SPEED (MPS)	WIND DIR (DEG-TRUE)	SIGMA THETA (DEG)	TEMPERATURE (DEG C)
93-12-07	00:00	0.7	140	11.8	-0.9
93-12-07	01:00	1.7	170	10.2	-3.5
93-12-07	02:00	1.8	157	9.7	-3.3
93-12-07	03:00	1.7	162	12.7	-3.7
93-12-07	04:00	1.9	171	13.1	-4.1
93-12-07	05:00	5.4	197	6.6	-3.4
93-12-07	06:00	4.9	193	7.6	-4.8
93-12-07	07:00	3.5	187	10.0	-4.6
93-12-07	08:00	5.5	197	7.7	-4.0
93-12-07	09:00	5.3	193	9.8	-3.0
93-12-07	10:00	5.4	187	11.4	-1.4
93-12-07	11:00	7.7	183	8.0	-1.0
93-12-07	12:00	7.2	199	7.5	-0.9
93-12-07	13:00	6.9	196	8.2	1.9
93-12-07	14:00	3.1	155	38.4	3.6

APPENDIX J

WeatherPak Audit Results

HORIZONTAL WIND SPEED AUDIT SHEET

~~Calibration~~ Loc 3/17/94

NORTH AMERICAN WEATHER CONSULTANTS

Operator Tom W
Site Name NAWC office
Project OHIAZ

Date 12/15/93 Start Time
Stn ID Stop Time
Client

Sensor Mfg RM Young / Coastal Climate
Serial No. Boat #1
Last Calibration Date 7/14/93

WS Sensor Model 05305-AQ
WS Sensor Ht (m) 12 m
WS Range 0 - 45 mps

WS Shaft Rotational Torque 5 gm-cm
Sensor Starting Threshold 0.4 m/s

AUDIT INPUT		PRIMARY DAS RESPONSE			BACKUP DAS RESPONSE		
(rpm)	(mps)	DAS (v)	DAS (mps)	DIFF (mps)	DAS (v)	DAS (mps)	DIFF (mps)
0	0		0	0			
2000	9.8		9.8	0			
4000	19.6		19.6	0			
6000	29.4		29.3	0.1			

Audit Criteria: ± .25 m/s when wind speed <= 5 m/s
± 5% when ws > 5 m/s

WS Audit Device RM Young
WS Audit Model 58-1
WS Audit SER #

Comments

Audited By TGW

HORIZONTAL WIND DIRECTION ~~AUDIT~~ SHEET

Calibration ck 3/17/94

NORTH AMERICAN WEATHER CONSULTANTS

Operator Tom W
Site Name NAWC office
Project 04142

Date 12/15/93 Start Time
Stn ID Stop Time
Client

Sensor Mfg RM Young / Coastal Climate
Serial No. Boat #1
Crossarm Alignment —
Site Declination — degrees
Last Calibration Date 7/14/93

WD Sensor Model 05305-AQ
WD Sensor Ht (m) 3m
WD Sensor Range 0- 360 degrees
WD Shaft Rotational Torque ccw < 6 gm-cm / cw < 6 gm-cm
Starting Threshold 0.5 m/s

AUDIT INPUT (deg)	AUDIT INPUT (deg)	PRIMARY DAS RESPONSE DAS (v)	PRIMARY DAS RESPONSE DAS (deg)	PRIMARY DAS RESPONSE DIFF (deg)	BACKUP DAS RESPONSE DAS (v)	BACKUP DAS RESPONSE DAS (deg)	BACKUP DAS RESPONSE DIFF (deg)
North	0/360		1	1			
East	90/450		91	1			
South	180/540		182	2			
West	270		272	2			
North	0/360		1	1			
West	270		271	1			
South	180/540		180	0			
East	90/450		91	1			

Audit Criteria: Alignment with true North: ± 5 degrees
Linearity Test ± 3 degrees
Starting Threshold: <= .5 m/s
NAWC Director Table

WD Audit Device ~~RM Young~~
WD Audit Model ~~5305~~
WD Audit Serial #

Comments Compass turned ccw

Audited By TGW

TEMPERATURE AUDIT SHEET

~~Calibration~~ LRC 3/17/94

NORTH AMERICAN WEATHER CONSULTANTS

Operator Tom W | Date 12/15/93 | Start Time _____

Site Name N.AWC office | Stn ID _____ | Stop Time _____

Project 04142 | Client _____

Sensor Mfg RM Young / Coastal Climate | Sensor Model YSI 44203

Serial No. Boate #1 | Sensor Ht (m) RB 3m

Range _____

Last Calibration Date ~~1994~~ 7/14/93

AUDIT INPUT (v)	AUDIT INPUT (°C)	PRIMARY DAS RESPONSE DAS (v)	PRIMARY DAS RESPONSE DAS (°C)	PRIMARY DAS RESPONSE DIFF (°C)	BACKUP DAS RESPONSE DAS (v)	BACKUP DAS RESPONSE DAS (°C)	BACKUP DAS RESPONSE DIFF (°C)
	20.0		19.9	-0.1			

Audit Criteria: ± 1.0 °C

Temperature Audit Device VWR 'a Thermometer

Temperature Audit Model ASTM 63C

Temperature Audit SER # 405766

Comments _____

Audited By TGW

APPENDIX I

FIELD SURVEY DATA

I.1 INTRODUCTION

I.1.0.1. This appendix presents the surveyed reference point location data (in State Plane coordinates) generated from the field topographic survey activities conducted prior to and following sampling activities at the investigated SWMUs. Also included are the sample locations and elevations from the Phase II RFI sampling activities at the Group A SWMUs.

I.2 SCOPE OF ACTIVITIES

I.2.0.1. The sample location activities were performed in several stages during the TEAD N RFI. These activities are described below.

I.2.0.2. Topographic Field Survey. In May 1992, prior to any field sampling activities, CRS personnel surveyed and marked a total of 48 separate reference locations at 17 SWMUs across TEAD-N. The purpose of this survey was to provide fixed survey reference points in the Utah State Plane Coordinate System at the SWMUs, enabling individual sampling locations to be tied to these points at the time of sampling. Individual sampling locations could then be placed into the Geotechnical Map File (GMA) of the IRDMIS data base. The primary method of marking the individual reference locations consisted of staking a 4 ft. section of wood lath into the ground at the reference point location and labeling the lath with the reference designation. Surveyors flagging was usually tied around the uppermost part of the stake for added visibility. At times, fixed objects such as building corners or utility posts were used as reference locations, and the building corner or post itself was flagged and labeled.

I.2.0.3. The reference points were used to tie individual sampling sites during both Phase I and Phase II sampling at each SWMU to the State Plane Coordinate System at the time of, or shortly after, sample collection. A tripod-mounted Brunton compass was used to measure angles and establish bearings to and from the established reference points. Most of the sampling locations during the RFI were generated using this method. However, during additional borehole sampling along the stormwater line in the Building 500 Series area and

at SWMU 48, sample locations and elevations were obtained using a 1" = 1000' scale map of TEAD-N with a State Plane grid. No surveyed reference points were available in these areas. An X-Y accuracy code of 1(± 10 meters) was used for the Brunton-located coordinates, and a code of 2 (± 100 meters) was used for those locations generated using the map.

I.2.0.5. Borehole and Well Surveying. Upon completion of the Phase I drilling program in August 1992, CRS personnel were again on site at TEAD-N to survey the locations of the nine deep soil borings previously drilled at the OB/OD Area, and the 25 ft. soil boring drilled at the Stormwater Discharge Area (SWMU 45). Following completion of the Phase II drilling activities in November 1993, CRS personnel surveyed the newly-completed monitoring wells at SWMU 45, and the deep boreholes and air monitoring stations at SWMU 42.

I.3 DATA SUMMARY

I.3.1. Surveyed Reference Points and Borehole Locations

I.3.1.1. The State plane northing and easting coordinates for each surveyed Group A SWMU reference point are shown in Table I-1. Also included is the elevation of each reference point in feet above mean sea level. The SWMU reference number is shown with the following designation:

XX-Y

where: XX = SWMU Number

where: Y = Sequential Designation of Reference Locations Within the SWMU

I.3.1.2. Table I-2 presents the data entered into the GMA from the RFI field sampling locations at the Group A SWMUs. These data include all source and accuracy codes, as required. The majority of sample locations from the RFI were entered with the X, Y Accuracy Code of "1" or "2", which designates a horizontal accuracy of 10 meters or 100 meters respectively, and a GS (elevation) Accuracy Code of "1", designating an accuracy of 10 feet vertically. An accuracy code of "0," designating a horizontal accuracy of ±1 meter and a vertical accuracy of ±1 foot, was used only for those locations or elevations directly surveyed by CRS personnel.

TABLE I-1

TOOELE ARMY DEPOT GROUP A SWMU SITE COORDINATES
JUNE 11, 1992
NAD 1927 State Plan Coordinate Data
Utah Central Zone Coordinates

SWMU Number	Northing	Easting	Elevation[a]
1A-1	793,431.47	1,728,024.23	5,101.29
1A-2	791,621.11	1,728,347.83	5,080.18
1A-3	792,579.81	1,728,622.45	5,078.94
1-4	791,651.51	1,729,258.41	5,067.84
1-5	790,401.45	1,729,919.58	5,047.76
1D-6	789,889.45	1,729,322.98	5,051.08
1B-1	789,648.58	1,732,502.63	5,009.92
1B-2	789,118.08	1,732,882.50	4,991.73
1B-3	790,588.98	1,732,182.87	5,062.34
1C-1	789,825.03	1,733,847.43	4,968.29
20-1	795,122.62	1,732,462.10	5,010.53
20-2	794,746.99	1,732,391.35	5,017.17
21-1	794,252.03	1,739,161.10	4,796.77
21-2	794,153.34	1,739,139.03	4,796.86
34-1	792,966.81	1,764,718.81	4,881.58
34-2	793,081.72	1,764,662.47	4,878.36
37-1	793,130.77	1,738,381.92	4,829.06
37-2	792,928.24	1,738,439.13	4,827.50
42-1	794,778.46	1,765,190.10	4,873.20
42-2	794,607.97	1,765,033.54	4,872.25
42-3	794,650.67	1,764,983.31	4,868.46
42-4	794,808.35	1,764,799.86	4,863.51
42-5	794,988.77	1,764,583.07	4,853.37
45-1	795,144.34	1,763,254.04	4,800.46

(a) Feet above mean sea level

TABLE I-2

TOOELE–NORTH RFI PHASE II SAMPLE LOCATION DATA
(PAGE 1 OF 12)

Site Type	Site ID	Y (North)	X (East)	X,Y Source*	X,Y Acc Code*	GS Elevation	GS Source*	GS Acc Code*	Int
AHOL	SB-37-001A	793,214	1,738,326	M	1	4825	M	1	DCK
AHOL	SB-37-001B	793,214	1,738,326	M	1	4825	M	1	DCK
AHOL	SB-37-001C	793,214	1,738,326	M	1	4825	M	1	DCK
AHOL	SB-37-002A	793,115	1,738,289	M	1	4825	M	1	DCK
AHOL	SB-37-002B	793,115	1,738,289	M	1	4825	M	1	DCK
AHOL	SB-37-002C	793,115	1,738,289	M	1	4825	M	1	DCK
AHOL	SB-37-003A	793,194	1,738,496	M	1	4830	M	1	DCK
AHOL	SB-37-003B	793,194	1,738,496	M	1	4830	M	1	DCK
AHOL	SB-37-003C	793,194	1,738,496	M	1	4830	M	1	DCK
AHOL	SB-37-004A	793,110	1,738,581	M	1	4825	M	1	DCK
AHOL	SB-37-004B	793,110	1,738,581	M	1	4825	M	1	DCK
AHOL	SB-37-004C	793,110	1,738,581	M	1	4825	M	1	DCK
AHOL	SB-37-005A	793,172	1,738,401	M	1	4825	M	1	DCK
AHOL	SB-37-005B	793,172	1,738,401	M	1	4825	M	1	DCK
AHOL	SB-37-005C	793,172	1,738,401	M	1	4825	M	1	DCK
AHOL	SB-37-006A	793,048	1,738,388	M	1	4830	M	1	DCK
AHOL	SB-37-006B	793,048	1,738,388	M	1	4830	M	1	DCK
AHOL	SB-37-006C	793,048	1,738,388	M	1	4830	M	1	DCK
AHOL	SB-37-007A	793,140	1,738,375	M	1	4830	M	1	DCK
AHOL	SB-37-007B	793,140	1,738,375	M	1	4830	M	1	DCK
AHOL	SB-37-007C	793,140	1,738,375	M	1	4830	M	1	DCK
AHOL	SB-42-050A	795,064	1,765,182	M	1	4870	M	1	DCK
AHOL	SB-42-050B	795,064	1,765,182	M	1	4870	M	1	DCK
AHOL	SB-42-051A	794,011	1,764,553	M	1	4865	M	1	DCK
AHOL	SB-42-051B	794,011	1,764,553	M	1	4865	M	1	DCK
AHOL	SB-BK-011A	793,400	1,737,320	M	2	4865	M	1	DCK
AHOL	SB-BK-011B	793,400	1,737,320	M	2	4865	M	1	DCK

TABLE I-2

TOOELE–NORTH RFI PHASE II SAMPLE LOCATION DATA
(PAGE 2 OF 12)

Site Type	Site ID	Y (North)	X (East)	X,Y Source*	X,Y Acc Code*	GS Elevation	GS Source*	GS Acc Code*	Int
AHOL	SB-BK-012A	792,400	1,739,350	M	2	4835	M	1	DCK
AHOL	SB-BK-012B	792,400	1,739,350	M	2	4835	M	1	DCK
ARMO	AR-42-001	793,661	1,764,569	S	0	4866.4	S	0	DCK
ARMO	AR-42-002	794,634	1,764,968	S	0	4867.5	S	0	DCK
ARMO	AR-42-003	794,336	1,766,035	S	0	4900.3	S	0	DCK
ARMO	AR-42-004	796,218	1,765,185	S	0	4858.5	S	0	DCK
BORE	SB-20-001A	795,012	1,732,539	M	1	5010	M	1	DCK
BORE	SB-20-001B	795,012	1,732,539	M	1	5010	M	1	DCK
BORE	SB-20-001C	795,012	1,732,539	M	1	5010	M	1	DCK
BORE	SB-20-002A	795,045	1,732,602	M	1	5010	M	1	DCK
BORE	SB-20-002B	795,045	1,732,602	M	1	5010	M	1	DCK
BORE	SB-20-002C	795,045	1,732,602	M	1	5010	M	1	DCK
BORE	SB-20-003A	795,087	1,732,669	M	1	5005	M	1	DCK
BORE	SB-20-003B	795,087	1,732,669	M	1	5005	M	1	DCK
BORE	SB-20-003C	795,087	1,732,669	M	1	5005	M	1	DCK
BORE	SB-20-004A	794,845	1,732,483	M	1	5010	M	1	DCK
BORE	SB-20-004B	794,845	1,732,483	M	1	5010	M	1	DCK
BORE	SB-20-004C	794,845	1,732,483	M	1	5010	M	1	DCK
BORE	SB-20-005A	794,781	1,732,517	M	1	5010	M	1	DCK
BORE	SB-20-005B	794,781	1,732,517	M	1	5010	M	1	DCK
BORE	SB-20-005C	794,781	1,732,517	M	1	5010	M	1	DCK
BORE	SB-20-006A	794,717	1,732,543	M	1	5010	M	1	DCK
BORE	SB-20-006B	794,717	1,732,543	M	1	5010	M	1	DCK
BORE	SB-20-006C	794,717	1,732,543	M	1	5010	M	1	DCK
BORE	SB-20-007A	794,832	1,732,391	M	1	5010	M	1	DCK
BORE	SB-20-007B	794,832	1,732,391	M	1	5010	M	1	DCK
BORE	SB-20-007C	794,832	1,732,391	M	1	5010	M	1	DCK
BORE	SB-20-008A	794,858	1,732,314	M	1	5015	M	1	DCK

TABLE I-2

TOOELE–NORTH RFI PHASE II SAMPLE LOCATION DATA
(PAGE 3 OF 12)

Site Type	Site ID	Y (North)	X (East)	X,Y Source*	X,Y Acc Code*	GS Elevation	GS Source*	GS Acc Code*	Int
BORE	SB-20-008B	794,858	1,732,314	M	1	5015	M	1	DCK
BORE	SB-20-008C	794,858	1,732,314	M	1	5015	M	1	DCK
BORE	SB-20-009A	794,825	1,732,257	M	1	5015	M	1	DCK
BORE	SB-20-009B	794,825	1,732,257	M	1	5015	M	1	DCK
BORE	SB-20-009C	794,825	1,732,257	M	1	5015	M	1	DCK
BORE	SB-20-010A	794,973	1,732,462	M	1	5010	M	1	DCK
BORE	SB-20-010B	794,973	1,732,462	M	1	5010	M	1	DCK
BORE	SB-20-010C	794,973	1,732,462	M	1	5010	M	1	DCK
BORE	SB-20-011A	794,954	1,732,331	M	1	5010	M	1	DCK
BORE	SB-20-011B	794,954	1,732,331	M	1	5010	M	1	DCK
BORE	SB-20-011C	794,954	1,732,331	M	1	5010	M	1	DCK
BORE	SB-20-012A	795,021	1,732,373	M	1	5010	M	1	DCK
BORE	SB-20-012B	795,021	1,732,373	M	1	5010	M	1	DCK
BORE	SB-20-012C	795,021	1,732,373	M	1	5010	M	1	DCK
BORE	SB-20-013A	795,077	1,732,335	M	1	5010	M	1	DCK
BORE	SB-20-013B	795,077	1,732,335	M	1	5010	M	1	DCK
BORE	SB-20-013C	795,077	1,732,335	M	1	5010	M	1	DCK
BORE	SB-20-014A	795,141	1,732,293	M	1	5010	M	1	DCK
BORE	SB-20-014B	795,141	1,732,293	M	1	5010	M	1	DCK
BORE	SB-20-014C	795,141	1,732,293	M	1	5010	M	1	DCK
BORE	SB-20-015A	795,130	1,732,423	M	1	5010	M	1	DCK
BORE	SB-20-015B	795,130	1,732,423	M	1	5010	M	1	DCK
BORE	SB-20-015C	795,130	1,732,423	M	1	5010	M	1	DCK
BORE	SB-20-016A	795,087	1,732,479	M	1	5010	M	1	DCK
BORE	SB-20-016B	795,087	1,732,479	M	1	5010	M	1	DCK
BORE	SB-20-016C	795,087	1,732,479	M	1	5010	M	1	DCK
BORE	SB-20-017A	795,037	1,732,490	M	1	5010	M	1	DCK
BORE	SB-20-017B	795,037	1,732,490	M	1	5010	M	1	DCK

TABLE I-2

TOOELE–NORTH RFI PHASE II SAMPLE LOCATION DATA
(PAGE 4 OF 12)

Site Type	Site ID	Y (North)	X (East)	X,Y Source*	X,Y Acc Code*	GS Elevation	GS Source*	GS Acc Code*	Int
BORE	SB-20-017C	795,037	1,732,490	M	1	5010	M	1	DCK
BORE	SB-20-018A	795,112	1,732,531	M	1	5010	M	1	DCK
BORE	SB-20-018B	795,112	1,732,531	M	1	5010	M	1	DCK
BORE	SB-20-018C	795,112	1,732,531	M	1	5010	M	1	DCK
BORE	SB-20-019A	795,058	1,732,703	M	1	5010	M	1	DCK
BORE	SB-20-019B	795,058	1,732,703	M	1	5010	M	1	DCK
BORE	SB-20-019C	795,058	1,732,703	M	1	5010	M	1	DCK
BORE	SB-34-001	793,051	1,764,681	M	1	4880	M	1	DCK
BORE	SB-34-001A	793,051	1,764,681	M	1	4880	M	1	DCK
BORE	SB-34-001B	793,051	1,764,681	M	1	4880	M	1	DCK
BORE	SB-34-001C	793,051	1,764,681	M	1	4880	M	1	DCK
BORE	SB-34-001D	793,051	1,764,681	M	1	4880	M	1	DCK
BORE	SB-34-001E	793,051	1,764,681	M	1	4880	M	1	DCK
BORE	SB-34-002	793,003	1,764,661	M	1	4880	M	1	DCK
BORE	SB-34-002A	793,003	1,764,661	M	1	4880	M	1	DCK
BORE	SB-34-002B	793,003	1,764,661	M	1	4880	M	1	DCK
BORE	SB-34-002C	793,003	1,764,661	M	1	4880	M	1	DCK
BORE	SB-34-002D	793,003	1,764,661	M	1	4880	M	1	DCK
BORE	SB-34-002E	793,003	1,764,661	M	1	4880	M	1	DCK
BORE	SB-34-003	793,013	1,764,681	M	1	4880	M	1	DCK
BORE	SB-34-003A	793,013	1,764,681	M	1	4880	M	1	DCK
BORE	SB-34-003B	793,013	1,764,681	M	1	4880	M	1	DCK
BORE	SB-34-003C	793,013	1,764,681	M	1	4880	M	1	DCK
BORE	SB-34-003D	793,013	1,764,681	M	1	4880	M	1	DCK
BORE	SB-34-003E	793,013	1,764,681	M	1	4880	M	1	DCK
BORE	SB-34-004A	792,961	1,764,626	M	1	4880	M	1	DCK
BORE	SB-34-004B	792,961	1,764,626	M	1	4880	M	1	DCK
BORE	SB-34-004C	792,961	1,764,626	M	1	4880	M	1	DCK

TABLE I-2

TOOELE–NORTH RFI PHASE II SAMPLE LOCATION DATA
(PAGE 5 OF 12)

Site Type	Site ID	Y (North)	X (East)	X,Y Source*	X,Y Acc Code*	GS Elevation	GS Source*	GS Acc Code*	Int
BORE	SB-34-005A	793,022	1,764,784	M	1	4885	M	1	DCK
BORE	SB-34-005B	793,022	1,764,784	M	1	4885	M	1	DCK
BORE	SB-34-005C	793,022	1,764,784	M	1	4885	M	1	DCK
BORE	SB-34-006A	793,119	1,764,701	M	1	4880	M	1	DCK
BORE	SB-34-006B	793,119	1,764,701	M	1	4880	M	1	DCK
BORE	SB-34-006C	793,119	1,764,701	M	1	4880	M	1	DCK
BORE	SB-34-007A	793,041	1,764,653	M	1	4880	M	1	DCK
BORE	SB-34-007B	793,041	1,764,653	M	1	4880	M	1	DCK
BORE	SB-34-007C	793,041	1,764,653	M	1	4880	M	1	DCK
BORE	SB-34-008A	793,023	1,764,652	M	1	4880	M	1	DCK
BORE	SB-34-008B	793,023	1,764,652	M	1	4880	M	1	DCK
BORE	SB-34-008C	793,023	1,764,652	M	1	4880	M	1	DCK
BORE	SB-34-009A	792,996	1,764,698	M	1	4880	M	1	DCK
BORE	SB-34-009B	792,996	1,764,698	M	1	4880	M	1	DCK
BORE	SB-34-009C	792,996	1,764,698	M	1	4880	M	1	DCK
BORE	SB-34-010A	793,024	1,764,725	M	1	4880	M	1	DCK
BORE	SB-34-010B	793,024	1,764,725	M	1	4880	M	1	DCK
BORE	SB-34-010C	793,024	1,764,725	M	1	4880	M	1	DCK
BORE	SB-34-011A	793,083	1,764,727	M	1	4880	M	1	DCK
BORE	SB-34-011B	793,083	1,764,727	M	1	4880	M	1	DCK
BORE	SB-34-011C	793,083	1,764,727	M	1	4880	M	1	DCK
BORE	SB-34-012A	793,039	1,764,694	M	1	4880	M	1	DCK
BORE	SB-34-012B	793,039	1,764,694	M	1	4880	M	1	DCK
BORE	SB-34-012C	793,039	1,764,694	M	1	4880	M	1	DCK
BORE	SB-42-014	794,658	1,764,966	S	0	4866.9	S	0	DCK
BORE	SB-42-014A	794,658	1,764,966	S	0	4866.9	S	0	DCK
BORE	SB-42-014B	794,658	1,764,966	S	0	4866.9	S	0	DCK
BORE	SB-42-014C	794,658	1,764,966	S	0	4866.9	S	0	DCK

TABLE I-2

TOOELE–NORTH RFI PHASE II SAMPLE LOCATION DATA
(PAGE 6 OF 12)

Site Type	Site ID	Y (North)	X (East)	X,Y Source*	X,Y Acc Code*	GS Elevation	GS Source*	GS Acc Code*	Int
BORE	SB-42-014D	794,658	1,764,966	S	0	4866.9	S	0	DCK
BORE	SB-42-014E	794,658	1,764,966	S	0	4866.9	S	0	DCK
BORE	SB-42-015	794,770	1,764,834	S	0	4863.1	S	0	DCK
BORE	SB-42-015A	794,770	1,764,834	S	0	4863.1	S	0	DCK
BORE	SB-42-015B	794,770	1,764,834	S	0	4863.1	S	0	DCK
BORE	SB-42-015C	794,770	1,764,834	S	0	4863.1	S	0	DCK
BORE	SB-42-015D	794,770	1,764,834	S	0	4863.1	S	0	DCK
BORE	SB-42-015E	794,770	1,764,834	S	0	4863.1	S	0	DCK
BORE	SB-42-016	794,871	1,764,714	S	0	4859.2	S	0	DCK
BORE	SB-42-016A	794,871	1,764,714	S	0	4859.2	S	0	DCK
BORE	SB-42-016B	794,871	1,764,714	S	0	4859.2	S	0	DCK
BORE	SB-42-016C	794,871	1,764,714	S	0	4859.2	S	0	DCK
BORE	SB-42-016D	794,871	1,764,714	S	0	4859.2	S	0	DCK
BORE	SB-42-016E	794,871	1,764,714	S	0	4859.2	S	0	DCK
BORE	SB-42-017	794,981	1,764,584	S	0	4853	S	0	DCK
BORE	SB-42-017A	794,981	1,764,584	S	0	4853	S	0	DCK
BORE	SB-42-017B	794,981	1,764,584	S	0	4853	S	0	DCK
BORE	SB-42-017C	794,981	1,764,584	S	0	4853	S	0	DCK
BORE	SB-42-017D	794,981	1,764,584	S	0	4853	S	0	DCK
BORE	SB-42-017E	794,981	1,764,584	S	0	4853	S	0	DCK
BORE	SB-42-018A	795,433	1,765,644	M	1	4875	M	1	DCK
BORE	SB-42-018B	795,433	1,765,644	M	1	4875	M	1	DCK
BORE	SB-42-018C	795,433	1,765,644	M	1	4875	M	1	DCK
BORE	SB-42-018D	795,433	1,765,644	M	1	4875	M	1	DCK
BORE	SB-42-019A	794,866	1,764,839	M	1	4860	M	1	DCK
BORE	SB-42-019B	794,866	1,764,839	M	1	4860	M	1	DCK
BORE	SB-42-019C	794,866	1,764,839	M	1	4860	M	1	DCK
BORE	SB-42-019D	794,866	1,764,839	M	1	4860	M	1	DCK

TABLE I-2

TOOELE–NORTH RFI PHASE II SAMPLE LOCATION DATA
(PAGE 7 OF 12)

Site Type	Site ID	Y (North)	X (East)	X,Y Source*	X,Y Acc Code*	GS Elevation	GS Source*	GS Acc Code*	Int
BORE	SB-42-020A	794,768	1,765,200	M	1	4870	M	1	DCK
BORE	SB-42-020B	794,768	1,765,200	M	1	4870	M	1	DCK
BORE	SB-42-020C	794,768	1,765,200	M	1	4870	M	1	DCK
BORE	SB-42-020D	794,768	1,765,200	M	1	4870	M	1	DCK
BORE	SB-42-021A	794,711	1,765,357	M	1	4870	M	1	DCK
BORE	SB-42-021B	794,711	1,765,357	M	1	4870	M	1	DCK
BORE	SB-42-021C	794,711	1,765,357	M	1	4870	M	1	DCK
BORE	SB-42-021D	794,711	1,765,357	M	1	4870	M	1	DCK
BORE	SB-42-022A	794,780	1,765,081	M	1	4870	M	1	DCK
BORE	SB-42-022B	794,780	1,765,081	M	1	4870	M	1	DCK
BORE	SB-42-022C	794,780	1,765,081	M	1	4870	M	1	DCK
BORE	SB-42-022D	794,780	1,765,081	M	1	4870	M	1	DCK
BORE	SB-42-023A	794,426	1,764,877	M	1	4870	M	1	DCK
BORE	SB-42-023B	794,426	1,764,877	M	1	4870	M	1	DCK
BORE	SB-42-023C	794,426	1,764,877	M	1	4870	M	1	DCK
BORE	SB-42-023D	794,426	1,764,877	M	1	4870	M	1	DCK
BORE	SB-42-024A	793,955	1,764,644	M	1	4870	M	1	DCK
BORE	SB-42-024B	793,955	1,764,644	M	1	4870	M	1	DCK
BORE	SB-42-024C	793,955	1,764,644	M	1	4870	M	1	DCK
BORE	SB-42-024D	793,955	1,764,644	M	1	4870	M	1	DCK
BORE	SB-42-025A	794,005	1,763,737	M	1	4850	M	1	DCK
BORE	SB-42-025B	794,005	1,763,737	M	1	4850	M	1	DCK
BORE	SB-42-025C	794,005	1,763,737	M	1	4850	M	1	DCK
BORE	SB-42-025D	794,005	1,763,737	M	1	4850	M	1	DCK
BORE	SB-42-026A	794,737	1,764,823	M	1	4865	M	1	DCK
BORE	SB-42-026B	794,737	1,764,823	M	1	4865	M	1	DCK
BORE	SB-42-026C	794,737	1,764,823	M	1	4865	M	1	DCK
BORE	SB-42-026D	794,737	1,764,823	M	1	4865	M	1	DCK

TABLE I-2

TOOELE–NORTH RFI PHASE II SAMPLE LOCATION DATA
(PAGE 8 OF 12)

Site Type	Site ID	Y (North)	X (East)	X,Y Source*	X,Y Acc Code*	GS Elevation	GS Source*	GS Acc Code*	Int
BORE	SB-42-027A	794,837	1,764,715	M	1	4870	M	1	DCK
BORE	SB-42-027B	794,837	1,764,715	M	1	4870	M	1	DCK
BORE	SB-42-027C	794,837	1,764,715	M	1	4870	M	1	DCK
BORE	SB-42-027D	794,837	1,764,715	M	1	4870	M	1	DCK
BORE	SB-42-028A	794,900	1,764,567	M	1	4860	M	1	DCK
BORE	SB-42-028B	794,900	1,764,567	M	1	4860	M	1	DCK
BORE	SB-42-028C	794,900	1,764,567	M	1	4860	M	1	DCK
BORE	SB-42-028D	794,900	1,764,567	M	1	4860	M	1	DCK
BORE	SB-42-029A	795,168	1,764,584	M	1	4840	M	1	DCK
BORE	SB-42-029B	795,168	1,764,584	M	1	4840	M	1	DCK
BORE	SB-42-029C	795,168	1,764,584	M	1	4840	M	1	DCK
BORE	SB-42-029D	795,168	1,764,584	M	1	4840	M	1	DCK
BORE	SB-42-030A	795,180	1,764,712	M	1	4845	M	1	DCK
BORE	SB-42-030B	795,180	1,764,712	M	1	4845	M	1	DCK
BORE	SB-42-031A	795,148	1,764,917	M	1	4860	M	1	DCK
BORE	SB-42-031B	795,148	1,764,917	M	1	4860	M	1	DCK
BORE	SB-42-032A	795,061	1,765,245	M	1	4870	M	1	DCK
BORE	SB-42-032B	795,061	1,765,245	M	1	4870	M	1	DCK
BORE	SB-42-033A	794,607	1,764,861	M	1	4865	M	1	DCK
BORE	SB-42-033B	794,607	1,764,861	M	1	4865	M	1	DCK
BORE	SB-42-034A	794,423	1,764,633	M	1	4865	M	1	DCK
BORE	SB-42-034B	794,423	1,764,633	M	1	4865	M	1	DCK
BORE	SB-42-035A	794,522	1,764,493	M	1	4865	M	1	DCK
BORE	SB-42-035B	794,522	1,764,493	M	1	4865	M	1	DCK
BORE	SB-42-036A	795,139	1,765,794	M	1	4880	M	1	DCK
BORE	SB-42-036B	795,139	1,765,794	M	1	4880	M	1	DCK
BORE	SB-42-037A	794,269	1,766,200	M	1	4900	M	1	DCK
BORE	SB-42-037B	794,269	1,766,200	M	1	4900	M	1	DCK

TABLE I-2

TOOELE–NORTH RFI PHASE II SAMPLE LOCATION DATA
(PAGE 9 OF 12)

Site Type	Site ID	Y (North)	X (East)	X,Y Source*	X,Y Acc Code*	GS Elevation	GS Source*	GS Acc Code*	Int
BORE	SB-42-038A	794,004	1,765,893	M	1	4900	M	1	DCK
BORE	SB-42-038B	794,004	1,765,893	M	1	4900	M	1	DCK
BORE	SB-42-039A	794,343	1,765,393	M	1	4885	M	1	DCK
BORE	SB-42-039B	794,343	1,765,393	M	1	4885	M	1	DCK
BORE	SB-42-040A	794,509	1,765,334	M	1	4875	M	1	DCK
BORE	SB-42-040B	794,509	1,765,334	M	1	4875	M	1	DCK
BORE	SB-42-041A	794,708	1,765,216	M	1	4870	M	1	DCK
BORE	SB-42-041B	794,708	1,765,216	M	1	4870	M	1	DCK
BORE	SB-42-042A	794,559	1,765,119	M	1	4870	M	1	DCK
BORE	SB-42-042B	794,559	1,765,119	M	1	4870	M	1	DCK
BORE	SB-42-043A	794,612	1,765,072	M	1	4870	M	1	DCK
BORE	SB-42-043B	794,612	1,765,072	M	1	4870	M	1	DCK
BORE	SB-42-044A	793,864	1,764,329	M	1	4865	M	1	DCK
BORE	SB-42-044B	793,864	1,764,329	M	1	4865	M	1	DCK
BORE	SB-42-045A	794,825	1,765,102	M	1	4870	M	1	DCK
BORE	SB-42-045B	794,825	1,765,102	M	1	4870	M	1	DCK
BORE	SB-42-046A	794,533	1,764,940	M	1	4870	M	1	DCK
BORE	SB-42-046B	794,533	1,764,940	M	1	4870	M	1	DCK
BORE	SB-42-047A	794,308	1,764,987	M	1	4870	M	1	DCK
BORE	SB-42-047B	794,308	1,764,987	M	1	4870	M	1	DCK
BORE	SB-42-048A	794,057	1,765,005	M	1	4870	M	1	DCK
BORE	SB-42-048B	794,057	1,765,005	M	1	4870	M	1	DCK
BORE	SB-42-049A	793,962	1,765,112	M	1	4870	M	1	DCK
BORE	SB-42-049B	793,962	1,765,112	M	1	4870	M	1	DCK
BORE	SB-45-002A	791,920	1,765,050	M	2	4900	M	1	DCK
BORE	SB-45-002B	791,920	1,765,050	M	2	4900	M	1	DCK
BORE	SB-45-003A	792,450	1,764,850	M	2	4890	M	1	DCK
BORE	SB-45-003B	792,450	1,764,850	M	2	4890	M	1	DCK

TABLE I-2

TOOELE–NORTH RFI PHASE II SAMPLE LOCATION DATA
(PAGE 10 OF 12)

Site Type	Site ID	Y (North)	X (East)	X,Y Source*	X,Y Acc Code*	GS Elevation	GS Source*	GS Acc Code*	Int
BORE	SB-45-004A	792,650	1,764,000	M	2	4860	M	1	DCK
BORE	SB-45-004B	792,650	1,764,000	M	2	4860	M	1	DCK
BORE	SB-45-005A	792,050	1,765,800	M	2	4890	M	1	DCK
BORE	SB-45-006A	792,350	1,764,250	M	2	4880	M	1	DCK
BORE	SB-45-006B	792,350	1,764,250	M	2	4880	M	1	DCK
BORE	SB-45-007A	792,550	1,764,300	M	2	4880	M	1	DCK
BORE	SB-45-007B	792,550	1,764,300	M	2	4880	M	1	DCK
BORE	SB-45-008A	793,700	1,764,900	M	2	4880	M	1	DCK
BORE	SB-45-008B	793,700	1,764,900	M	2	4880	M	1	DCK
BORE	SB-45-009A	793,800	1,764,590	M	1	4870	M	1	DCK
BORE	SB-45-009B	793,800	1,764,590	M	1	4870	M	1	DCK
BORE	SB-45-010A	792,620	1,764,150	M	2	4865	M	1	DCK
BORE	SB-45-011A	793,350	1,763,850	M	2	4850	M	1	DCK
BORE	SB-45-011B	793,350	1,763,850	M	2	4850	M	1	DCK
BORE	SB-45-012A	793,830	1,764,560	M	1	4870	M	1	DCK
BORE	SB-45-012B	793,830	1,764,560	M	1	4870	M	1	DCK
BORE	SB-45-013A	792,700	1,765,000	M	2	4890	M	1	DCK
BORE	SB-45-013B	792,700	1,765,000	M	2	4890	M	1	DCK
BORE	SB-45-014A	792,150	1,764,600	M	2	4890	M	1	DCK
BORE	SB-45-014B	792,150	1,764,600	M	2	4890	M	1	DCK
BORE	SB-45-015A	792,770	1,764,610	M	1	4880	M	1	DCK
BORE	SB-48-001A	792,000	1,765,750	M	2	4920	M	1	DCK
BORE	SB-48-001B	792,000	1,765,750	M	2	4920	M	1	DCK
BORE	SB-48-002A	792,300	1,766,050	M	2	4925	M	1	DCK
BORE	SB-48-002B	792,300	1,766,050	M	2	4925	M	1	DCK
BORE	SB-BK-007A	795,240	1,731,761	M	2	5020	M	1	DCK
BORE	SB-BK-007B	795,240	1,731,761	M	2	5020	M	1	DCK
BORE	SB-BK-008A	794,203	1,733,233	M	2	5000	M	1	DCK

TABLE I-2

TOOELE–NORTH RFI PHASE II SAMPLE LOCATION DATA
(PAGE 11 OF 12)

Site Type	Site ID	Y (North)	X (East)	X,Y Source*	X,Y Acc Code*	GS Elevation	GS Source*	GS Acc Code*	Int
BORE	SB-BK-008B	794,203	1,733,233	M	2	5000	M	1	DCK
BORE	SB-BK-009A	793,700	1,763,950	M	2	4850	M	1	DCK
BORE	SB-BK-009B	793,700	1,763,950	M	2	4850	M	1	DCK
BORE	SB-BK-010A	793,090	1,764,310	M	2	4870	M	1	DCK
BORE	SB-BK-010B	793,090	1,764,310	M	2	4870	M	1	DCK
BORE	SB-BK-013A	793,321	1,763,598	M	2	4850	M	1	DCK
BORE	SB-BK-013B	793,321	1,763,598	M	2	4850	M	1	DCK
BORE	SB-BK-014A	796,355	1,764,271	M	2	4830	M	1	DCK
BORE	SB-BK-014B	796,355	1,764,271	M	2	4830	M	1	DCK
BORE	SB-BK-015A	793,567	1,766,900	M	2	4930	M	1	DCK
BORE	SB-BK-015B	793,567	1,766,900	M	2	4930	M	1	DCK
COMP	SS-37-013	793,627	1,738,321	M	1	4820	M	1	DCK
COMP	SS-37-014	793,536	1,738,676	M	1	4820	M	1	DCK
COMP	SS-37-015	793,146	1,738,921	M	1	4820	M	1	DCK
COMP	SS-37-016	792,810	1,738,841	M	1	4825	M	1	DCK
COMP	SS-37-017	792,608	1,738,555	M	1	4830	M	1	DCK
COMP	SS-37-018	792,663	1,738,174	M	1	4840	M	1	DCK
COMP	SS-37-019	792,928	1,738,019	M	1	4835	M	1	DCK
COMP	SS-37-020	793,389	1,737,953	M	1	4830	M	1	DCK
COMP	SS-42-009	795,121	1,765,243	M	2	4870	M	1	DCK
COMP	SS-42-010	794,642	1,764,872	M	2	4870	M	1	DCK
COMP	SS-42-011	794,960	1,764,554	M	2	4860	M	1	DCK
COMP	SS-42-012	794,271	1,764,643	M	2	4870	M	1	DCK
COMP	SS-42-013	793,635	1,764,607	M	2	4870	M	1	DCK
COMP	SS-42-014	794,237	1,765,636	M	2	4890	M	1	DCK
COMP	SS-42-015	794,820	1,765,919	M	2	4890	M	1	DCK
COMP	SS-42-016	794,952	1,765,585	M	2	4880	M	1	DCK
COMP	SS-BK-001	793,371	1,763,623	M	1	4850	M	1	DCK

TABLE I-2

TOOELE–NORTH RFI PHASE II SAMPLE LOCATION DATA
(PAGE 12 OF 12)

Site Type	Site ID	Y (North)	X (East)	X,Y Source*	X,Y Acc Code*	GS Elevation	GS Source*	GS Acc Code*	Int
EXCV	EP-42-001A	795,032	1,764,927	M	1	4870	M	1	DCK
EXCV	EP-42-001B	795,032	1,764,927	M	1	4870	M	1	DCK
EXCV	EP-42-002A	794,148	1,764,203	M	1	4860	M	1	DCK
EXCV	EP-42-002B	794,148	1,764,203	M	1	4860	M	1	DCK
POND	SD-21-001	794,134	1,739,273	M	1	4795	M	1	DCK
POND	SD-21-002	794,161	1,739,285	M	1	4795	M	1	DCK
POND	SW-21-001	794,131	1,739,273	M	1	4795	M	1	DCK
SURF	SS-01-009	789,950	1,730,350	M	2	5040	M	1	DCK
SURF	SS-01-010	791,175	1,729,025	M	2	5065	M	1	DCK
SURF	SS-01-011	791,350	1,728,300	M	2	5070	M	1	DCK
SURF	SS-01-012	791,657	1,728,802	M	2	5070	M	1	DCK
SURF	SS-21-011	794,076	1,739,203	M	1	4795	M	1	DCK
SURF	SS-21-012	794,239	1,739,118	M	1	4795	M	1	DCK
SURF	SS-21-013	794,233	1,739,145	M	1	4795	M	1	DCK
SURF	SS-21-014	794,286	1,739,167	M	1	4795	M	1	DCK

*Codes:
X, Y Source
S = Surveyed, or by using surveyed reference points
M = Estimated from a USGS map (or other reliable site map)
G = Global Positioning System (GPS)
X,Y Accuracy
0= 1 meter, 1 = 10 meters, 2 = 100 meters, 3 = 1000 meters, 9 = Accuracy is unknown
GS Elev. Source
S = Surveyed, or by using surveyed reference points
M = Estimated from a USGS map (or other reliable site map)
G = Global Positioning System (GPS)
GS Accuracy
0 = 1 ft, 1 = 10 ft, 8 = 0.1 ft, 9 = Accuracy is unknown

I.3.1.3. Table I-3 shows the State plane northing and easting coordinates and elevations for the surveyed boreholes, monitoring wells, and air sampling stations. The elevations shown are for the ground surface immediately adjacent to each borehole or Hi-Vol air sampler, or the concrete pad surface at each monitoring well. The elevation for the top of the inside well casing is also included for the monitoring wells. The monitoring well designation is that assigned by the Army. The borehole and air sampler designations follow the convention:

SB-XX-YY

where: SB or AR = Soil Boring or Air Station
XX = SWMU Number of BK = background
YY = sequential boring number within that SWMU

The final entry on Table I-3 is for Water Well No. 3 (WW-3), which was the source for the approved water used during both Phase I and Phase II field activities.

I.3.1.4. All directly surveyed locations and elevations (the monitoring wells, air monitoring stations, and soil boring 25 feet deep or deeper), as well as the SWMU site coordinates, were surveyed under the direct supervision of a registered professional land surveyor. All data submitted had a pre-balanced closure error of 1:20,000 or better, and a vertical tolerance equal to or better than the specifications stipulated in the USAEC Geotechnical Requirements (i.e., within 0.05 feet, or 1.5 centimeters).

TABLE I-3

TEAD-N RFI SURVEYED SAMPLE LOCATIONS
NAD 1927 State Plane Coordinate Data
Utah Central Zone Coordinates

Sampled Location	Northing	Easting	Elevation[(a)]	Description
SB-01-001	792,433.27	1,728,465.03	5,079.12	100-foot Soil Boring
SB-01-002	792,165.79	1,729,037.11	5,066.21	100-foot Soil Boring
SB-01-003	791,632.91	1,728,990.06	5,066.83	100-foot Soil Boring
SB-01-004	791,361.88	1,728,218.71	5,082.89	100-foot Soil Boring
SB-01-005	789,959.21	1,729,523.94	5,048.48	100-foot Soil Boring
SB-01-006	790,190.57	1,732,668.24	5,017.15	100-foot Soil Boring
SB-01-007	789,244.92	1,732,749.27	4,994.07	100-foot Soil Boring
SB-01-008	789,492.91	1,733,152.54	4,987.85	100-foot Soil Boring
SB-BK-006	787,501.10	1,727,024.49	5,126.05	100-foot Background Soil Boring
AR-42-001	793,661.48	1,764,568.83	4,866.42	TSP Air Sampling Station
AR-42-002	794,634.32	1,764,968.25	4,867.45	TSP Air Sampling Station
AR-42-003	794,331.42	1,766,039.74	4,900.44	TSP Air Sampling Station
AR-42-004	796,218.33	1,765,185.06	4,858.48	TSP Air Sampling Station
SB-42-014	794,658.33	1,764,965.83	4,866.93	100-foot Soil Boring
SB-42-015	794,769.63	1,764,833.87	4,868.06	100-foot Soil Boring
SB-42-016	794,871.18	1,764,713.51	4,859.20	100-foot Soil Boring
SB-42-017	794,981.31	1,764,584.42	4,852.95	100-foot Soil Boring
SB-45-001	795,169.80	1,763,257.99	4,799.59	25-foot Soil Boring
N-142-93	794,710.61	1,763,149.34	4,827.40 4,829.51 (TOC)	Monitoring Well
N-143-93	795,340.61	1,763,070.59	4,796.20 4,798.55 (TOC)	Monitoring Well
WW-3	797,690.29	1,764,914.48	4,833.00	Depot Supply Well/ Source Water

All surveyed locations have an X, Y accuracy of ±1 meter and a GS accuracy of 0.1 foot.

TOC Top of PVC casing

(a) Feet above mean sea level

APPENDIX J

GEOTECHNICAL TESTING RESULTS

J.1 INTRODUCTION

J.1.0.1. This appendix presents the data from the geotechnical testing of selected soil samples collected during the course of the Phase II RFI field investigation at TEAD-N. All soil samples collected for geotechnical analyses were submitted to Dames and Moore, Inc. for analysis at their geotechnical laboratory in Salt Lake City, Utah. These soil samples were submitted for the purposes of confirming the on-site soil descriptions and USCS designations made on all collected soil samples.

J.1.0.2. Soil samples submitted for geotechnical testing were selected by Montgomery Watson personnel according to the following criteria:

- At least one representative sample of each soil horizon sampled at each SWMU or encountered at the background soil sampling locations.
- Representative samples of each major soil unit encountered in the 100-foot deep soil borings at the Bomb Washout Building (SWMU 42).
- Representative samples of each major soil unit encountered during drilling of the two new monitoring wells at the Stormwater Discharge Area (SWMU 45).

J.1.0.3. In addition to those samples submitted for geotechnical analysis, aliquots of all samples collected from the 100-foot deep borings at SWMU 42 and from the monitoring well borings at SWMU 45 were archived for future inspection and geotechnical analysis by USAEC personnel. These additional aliquots were placed in commercially available Mason jars, labeled, and placed back into their respective cardboard boxes. The samples are currently being held by Montgomery Watson pending storage instructions from TEAD-N EMO personnel.

J.2 GEOTECHNICAL PROGRAM

J.2.1. Geotechnical Program Summary

J.2.1.1. A total of 46 selected soil samples were submitted for the following analyses:

- Particle size determination using sieve analysis, including percent moisture content.
- Atterburg Limits analysis.
- Specific gravity determination.

J.2.1.2. Results were received for 46 sieve analyses, 22 Atterburg Limits analyses, and 43 specific gravity determinations. Atterburg limits could not be determined on 24 of the samples due to their non-plastic nature. Three samples lacked sufficient quantity to determine specific gravity. USCS designations were not made for two of the samples for which neither Atterburg limits nor specific gravity could be determined.

J.2.2. Summary of Sample Results

J.2.2.1. Sieve Analysis. The soil samples were placed through a total of 12 sieves, ranging in size from 100 mm to 0.075 mm (#200), and the percent of total weight retained on each sieve was recorded. On the basis of the sieve analyses, the following designations were made for the 46 tested samples:

- Twenty-one of the soils were gravels (i.e., the largest fraction of the soil, by weight, was composed of material retained on a #4 sieve).
- Eleven of the soils were sands (i.e., the largest soil fraction, by weight, passed a #4 sieve, but was retained on a #200 sieve).
- Twelve of the samples were fine-grained soils (i.e., the largest fraction of material, by weight, passed a #200 sieve).

J.2.2.2. Atterburg Limits Analysis. Twenty-four samples were not sufficiently plastic as to allow Atterburg determinations. The results of the 22 completed analyses are as follows:

- Seven of the soils were designated as lean clays (CL).
- Three of the soils were designated as silts (ML).
- Twelve of the samples were given the classification CL-ML, a borderline designation between lean clay and silt.
- No designations of CH (fat clay) or MH (elastic silt) were made.
- The Plasticity Index determinations (Liquid Limit minus the Plastic Limit) for the analyzed samples ranged from 2 to 25.

J.2.2.3. Specific Gravity Analysis. Result of the Specific Gravity analyses can be summarized as follows:

- Specific gravity determinations of fine-grained soils ranged from 2.61 to 2.76 grams per cubic centimeter (g/cc).
- Specific gravities of the coarse-grained soils ranged from 2.62 to 2.71 g/cc.

J.2.2.4. USCS Designations. To make a final laboratory USCS designation, results from the sieve and Atterburg Limits analyses are both used. The final USCS classifications for the submitted soil samples are summarized as:

Soil Type	Number of Samples
Gravel	21
Sand	11
Clay	6
Silt	3
Silt/Clay	3

J.2.3. Comparison of Field Classification With Laboratory Classification. Table J-1 shows USCS designations assigned in the field and by the laboratory. There was agreement between the field classification and laboratory classification on 17 of the 44 samples that received a USCS designation from the laboratory. Of the 27 samples that did not have exact correlation, discrepancies were relatively minor and can generally be attributed to sampling bias. Sample recovery from the deep soil borings tended to favor fine to coarse gravels, although both larger and smaller sizes were observed in the soil cuttings. Larger sizes will not fit in a split-spoon sampler and sand sizes were commonly not retained by the sampler. For those samples collected from the shallow borings, the geotechnical lab received that portion which remained after homogenization and collection of the chemical sample. For these reasons, the geotechnical lab often received an artificially sorted sample that was not representative of those samples described in the field.

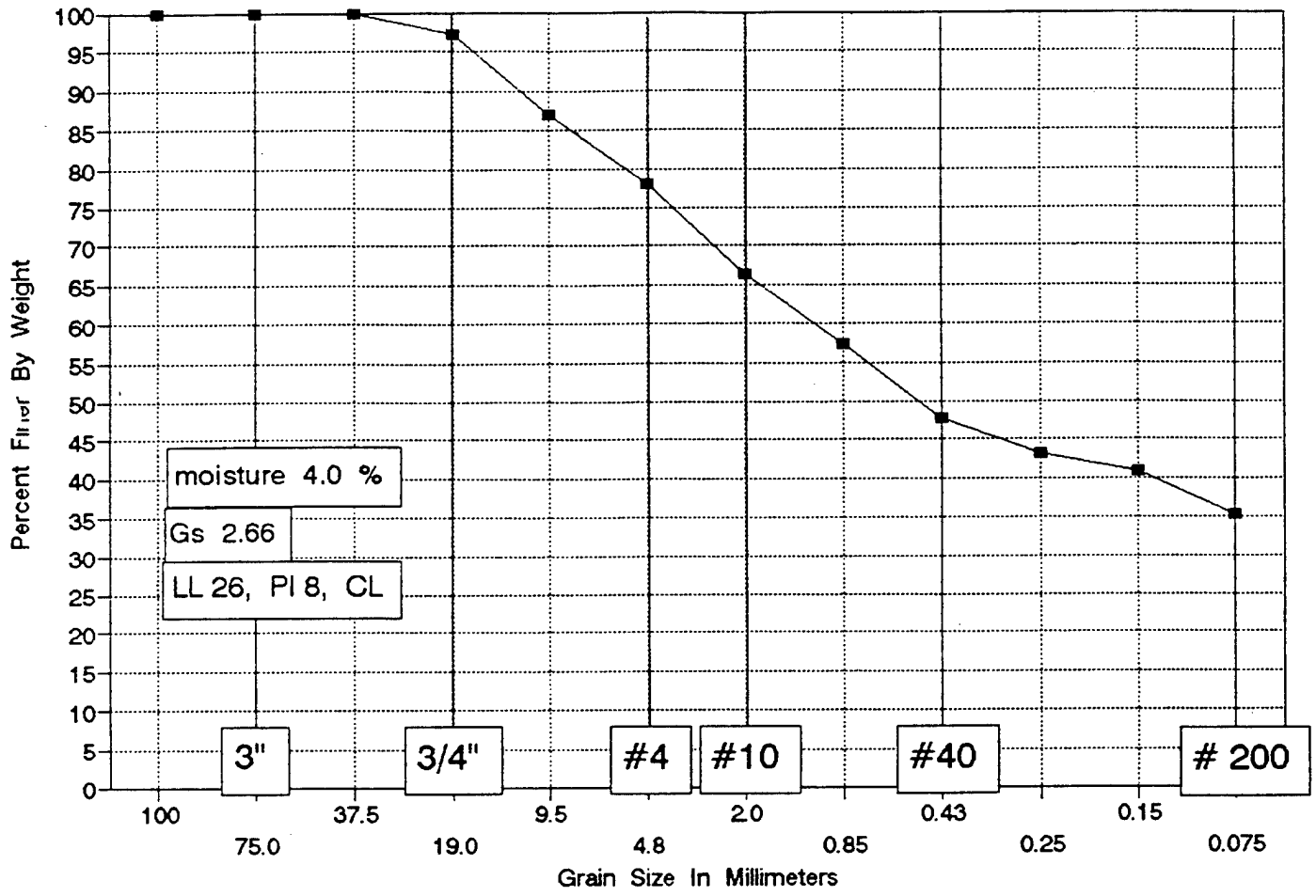
TABLE J-1

COMPARISON OF FIELD WITH LABORATORY USCS CLASSIFICATIONS

Sample I.D.	Depth (ft.)	Field USCS Classification	Laboratory USCS Classification
N-142-93	0 - 2	SM	CL
N-142-93	5 - 7	GM	GP
N-142-93	15 - 17	GW	GP
N-142-93	45 - 47	CH	CL
N-142-93	70 - 72	SC	CL-ML
N-142-93	80 - 82	GC	GP
N-142-93	90 - 92	CL	CL
N-143-93	0 - 2	CH	CL
N-143-93	15 - 17	CL	CL-ML
N-143-93	20 - 22	GC	GM
N-143-93	40 - 41	SC	ML
N-143-93	45 - 47	GP	--
N-143-93	70 - 72	GW	--
N-143-93	85 - 87	GM	GP
SB-20-001B	1 - 2	SM	GC-GM
SB-20-002A	0 - 1	SM	SC-SM
SB-20-006A	0 - 1	SM	SC-SM
SB-20-011B	1 - 2	GM	GM
SB-20-012C	2 - 3	GM	GP
SB-20-016A	0 - 1	SM	SM
SB-20-018C	2 - 3	SM	GC-GM
SB-20-019B	1 - 2	SM	SC-SM
SB-34-001A	0 - 2	SM	GP-GM
SB-34-002D	12.5 - 15	SW-SM	GP
SB-34-003A	0 - 2	GM	GC-GM
SB-34-003B	4 - 5	GM	GP
SB-34-003E	18 - 20	SW-SM	GP
SS-37-016	0 - 0.5	SM	SM
SS-37-020	0 - 0.5	SM	SM
SB-37-003C	2.5 - 3	SM	SM
SB-42-014	20 - 22	GW	GP-GM
SB-42-014	35 - 37	SC	ML
SB-42-015	76.5 - 77	SP	ML
SB-42-016	70 - 72	SM	CL-ML
SB-42-017	5 - 7	GM	GP-GM
SB-42-017	60 - 62	CL	CL
SB-42-017	75 - 77	GC	GC
SB-42-018	1.5 - 3	SM	GM
SB-42-021B	2 - 4	SM	GP-GM
SB-42-029	3 - 5	SW-SM	GC-GM
SB-42-033A	0 - 2	SM	SC-SM
SB-42-037A	0 - 2	SM-SC	CL
SB-42-046B	3 - 5	SW-SM	GP-GM
SB-BK-007B	1.5 - 3	SP	SM
SB-BK-010A	0 - 1.5	SM	SC-SM
SB-BK-011A	0 - 0.5	SM	SM

GRADATION CURVE

Location N-142-93, at 0.0-2.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring N-142-93
Sample at 0-2 feet

	totals
Wt soil and dish	116
Dry soil & dish	113.2
Dish	43.8
wet soil	571.9
dish	36
dry total	515.1

Moisture Content = 4.0 %

SIEVE ANALYSIS

Total sample dry = 515.1 g

Weight of sample split #4 93.4 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	13.59	97.36%	97.4	19.0
3/8 inch	66.86	87.02%	87.0	9.5
# 4	113.11	78.04%	78.0	4.8
# 10	14.03	66.32%	66.3	2.0
# 20	24.71	57.40%	57.4	0.85
# 40	36.26	47.74%	47.7	0.43
# 60	41.74	43.17%	43.2	0.25
# 100	44.44	40.91%	40.9	0.15
# 200	51.19	35.27%	35.3	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/28/94

BORING N-142 SAMPLE 93 DEPTH 0-2' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	571.9
WT. OF ~~RINGS~~ DISH	36.0
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/29 Ⓐ #4	1/29 Ⓑ #4	
PAN	E-4	100	GT-29	
WT. OF PAN & WET SOIL	116.0	233.7	205.7	
WT. OF PAN & DRY SOIL	113.2	232.7	202.7	
WT. OF MOISTURE				
WT. OF PAN	43.8	109.2	109.3	
WT. OF DRY SOIL				
MOISTURE CONTENT %	4.0	—	3.2	

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE 515.1

TOTAL WEIGHT OF BULK SAMPLE (LBS) ✓ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		13.59			
☐			3/8"		60.96			
☑			#4		113.11			
☐			#10		14.03			
☐			#20		24.71			
☑			#40		36.76			
☐			#60		41.74			
☐			#100		44.44			
☐			#200		51.19			
☐								
☐								

NOTE: (1) G_s 2.66

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Watson

LOCATION TEAD-N REI

BORING N-142 SAMPLE 93 DEPTH 0-2'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

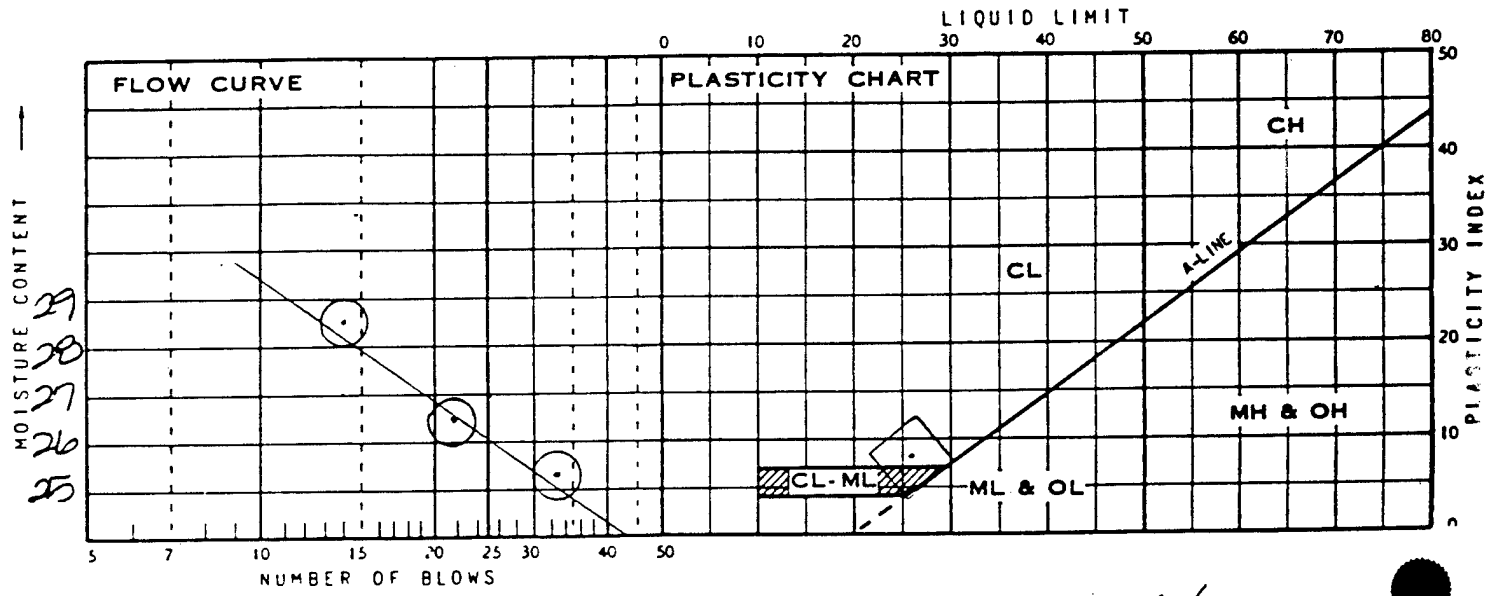
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY LAF 2/19/94

DETERMINATION	1	2	3	4	5	6
DISH	27	AL16				
WT OF DISH + WET SOIL	14.47	14.06				
WT OF DISH + DRY SOIL	12.47	12.14	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	18.07	17.88	AV=18			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	A-3	117	A-2			
NUMBER OF BLOWS	33	22	14			
WT OF DISH + WET SOIL	9.91	10.82	12.40			
WT OF DISH + DRY SOIL	8.19	8.95	9.96	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	25.33	26.44	28.50			



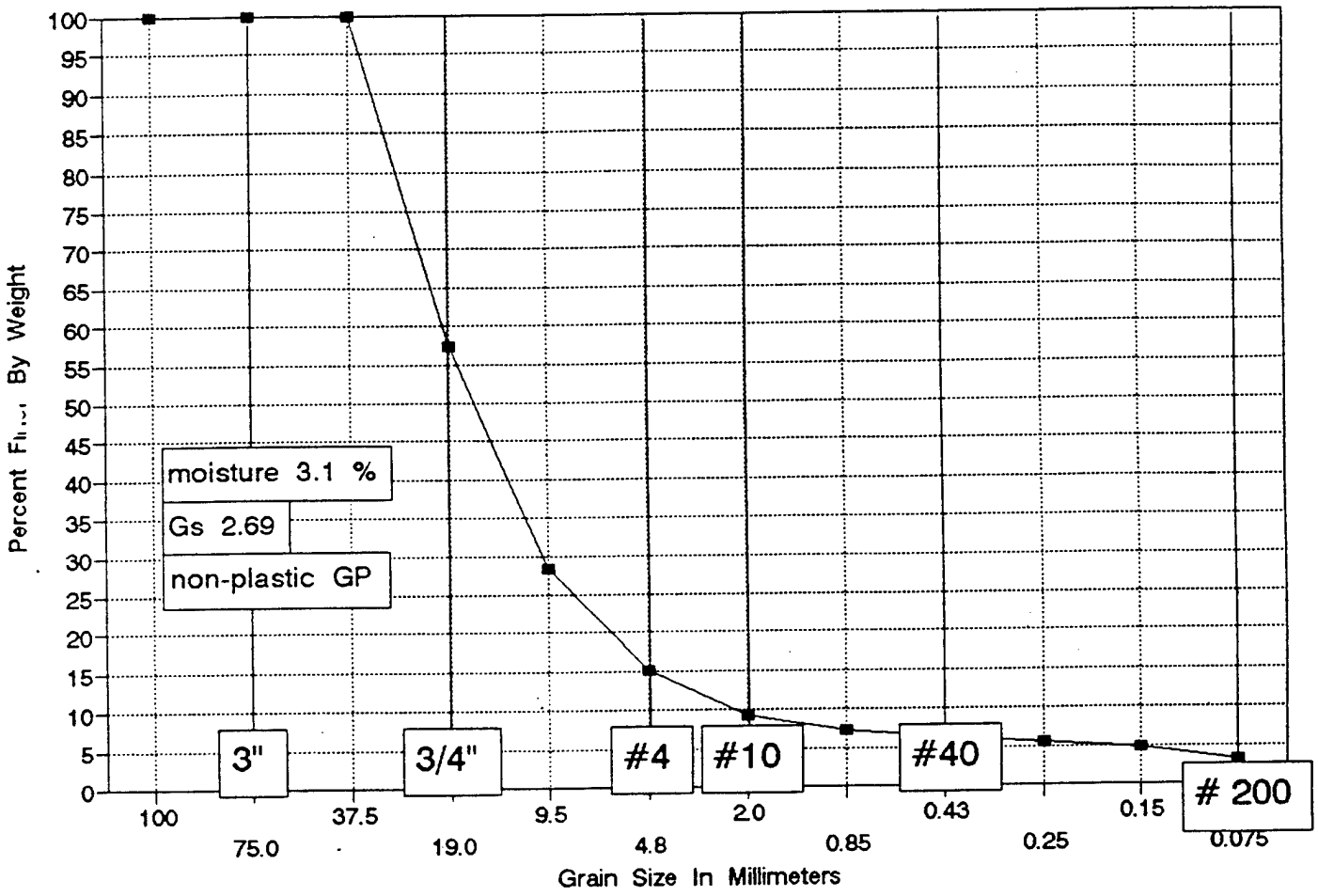
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		26	18	8	CL	

DAMES & MOORE

GRADATION CURVE

Location N-142-93, at 5.0-7.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring N-142-93
Sample at 5-7 feet

	totals
Wt soil and dish	209.9
Dry soil & dish	207
Dish	112.9
wet soil	584.2
dish	11.8
dry total	555.3

Moisture Content = 3.1 %

SIEVE ANALYSIS

Total sample dry = 555.3 g

Weight of sample split #4 53.9 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	236.88	57.34%	57.3	19.0
3/8 inch	398	28.33%	28.3	9.5
# 4	470.8	15.22%	15.2	4.8
# 10	21.37	9.18%	9.2	2.0
# 20	28.59	7.14%	7.1	0.85
# 40	32.01	6.18%	6.2	0.43
# 60	34.29	5.54%	5.5	0.25
# 100	37.12	4.74%	4.7	0.15
# 200	43.22	3.01%	3.0	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/26/94

BORING N-142 SAMPLE 93 DEPTH 5-7' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	584.2
WT. OF ~~RINGS~~ DISH	11.8
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/28 #4	1/28 #4	
PAN	M-28	315	GT-22	
WT. OF PAN & WET SOIL	209.9	464.2	162.9	
WT. OF PAN & DRY SOIL	207.0	462.6	162.4	
WT. OF MOISTURE				
WT. OF PAN	112.9	110.7	108.5	
WT. OF DRY SOIL				
MOISTURE CONTENT %	3.1	—	0.9	

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE 555.3

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		236.86			
☐			3/8"		398.0			
☑			#4		470.8			
☐			#10		21.37			
☐			#20		29.59			
☑			#40		32.01			
☐			#60		34.29			
☐			#100		37.12			
☐			#200		43.22			
☐								
☐								

NOTE: (2) $G_s = 2.69$

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Watson

LOCATION LEAD-N

BORING N-142 SAMPLE 92 DEPTH 5-7'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

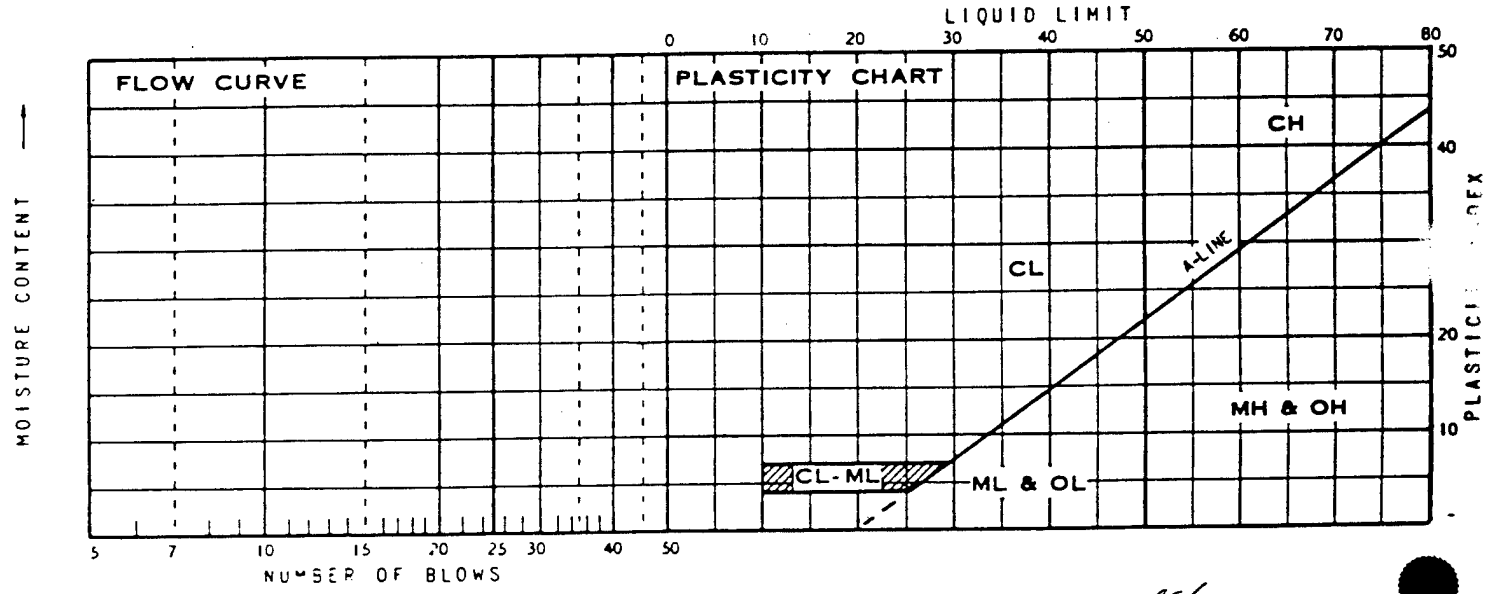
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY CAF 1/29/97

DETERMINATION	1	2	3	4	5	6
DISH		could not thread				
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



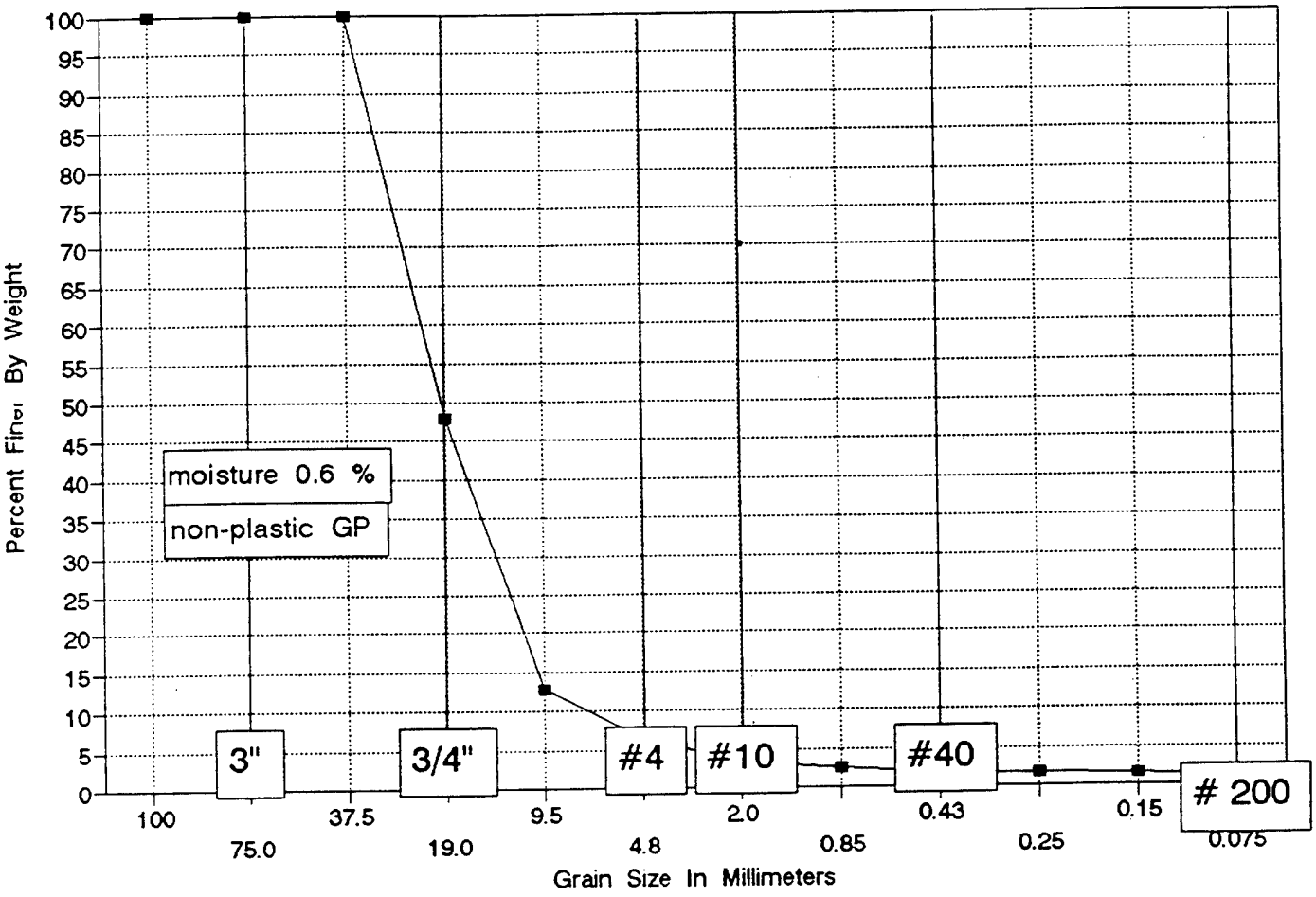
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location N-142-93, at 15.0-17.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring N-142-93
Sample at 15-17 feet

	totals
Wt soil and dish	191.1
Dry soil & dish	190
Dish	13.2
wet soil	564.9
dish	36.7
dry total	524.9

Moisture Content = 0.6 %

SIEVE ANALYSIS

Total sample dry = 524.9 g

Weight of sample split #4 22.9 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	273.98	47.81%	47.8	19.0
3/8 inch	458.2	12.71%	12.7	9.5
# 4	491	6.46%	6.5	4.8
# 10	11.47	3.23%	3.2	2.0
# 20	14.91	2.26%	2.3	0.85
# 40	16.32	1.86%	1.9	0.43
# 60	17.09	1.64%	1.6	0.25
# 100	17.75	1.45%	1.5	0.15
# 200	19.11	1.07%	1.1	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/26/94

BORING N-142 SAMPLE 93 DEPTH 15-17' BY LAF

JAR ~~DENSITY~~	total WT.	MOISTURE ANALYSIS	m.c.	1/28 #4	1/28 #4	
HEIGHT= DIAMETER=		PAN	K-1	302	314	
NUMBER OF RINGS		WT. OF PAN & WET SOIL	191.1	610.1	133.2	
WT. OF ~~RINGS~~ & WET SOIL	564.9	WT. OF PAN & DRY SOIL	190.0	608.7	132.8	
WT. OF ~~RINGS~~ Dish	36.7	WT. OF MOISTURE				
WT. OF WET SOIL		WT. OF PAN	13.2	113.5	109.9	
FIELD DENSITY		WT. OF DRY SOIL				
DRY DENSITY		MOISTURE CONTENT %	0.6	—	1.7	

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE 524.9

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		273.98			
☐			3/8"		458.2			
☑			#4		491.0			
☐			#10		11.47			
☐			#20		14.91			
☑			#40		16.32			
☐			#60		17.09			
☐			#100		17.75			
☐			#200		19.11			
☐								

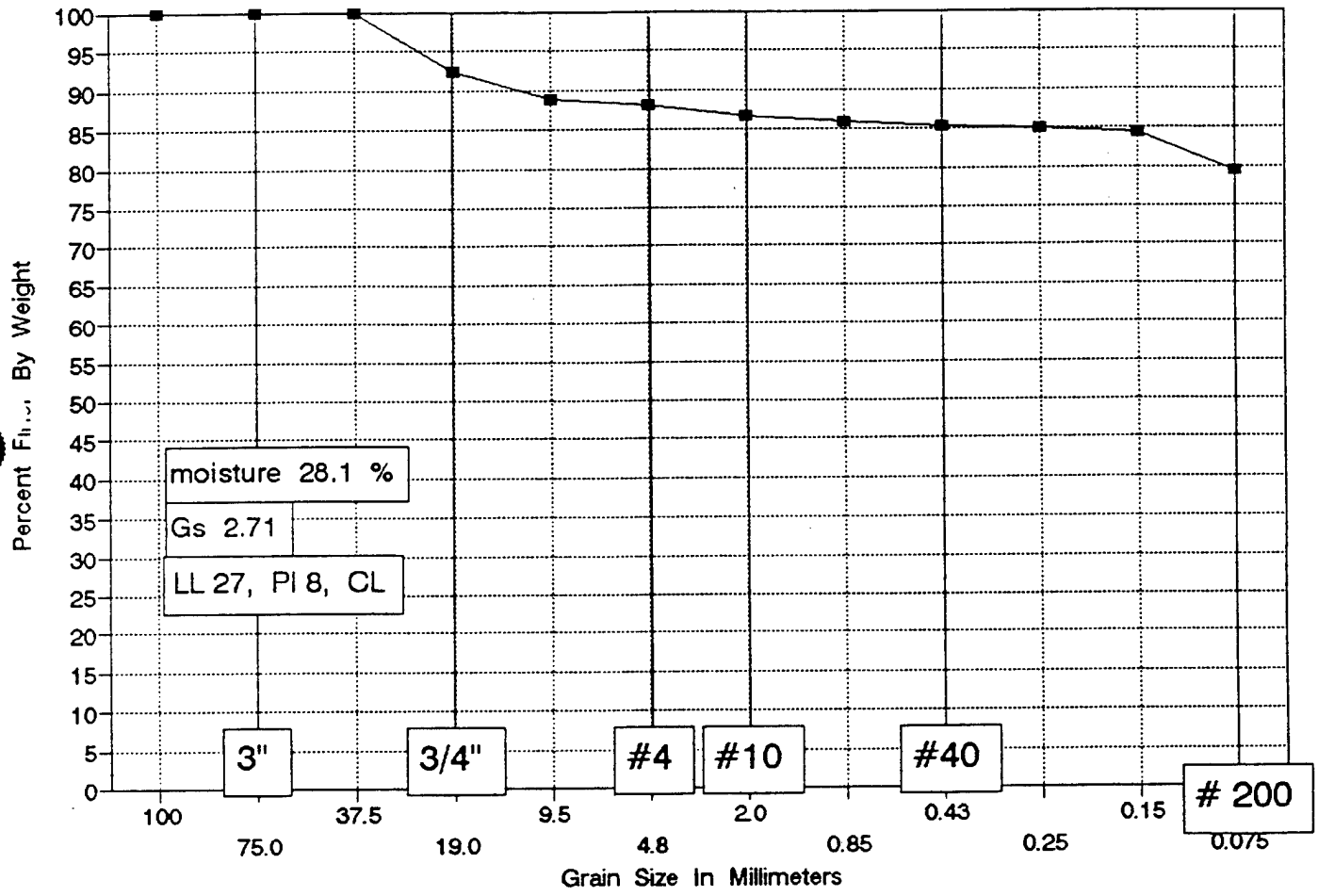
(3)

NOTE: Nonplastic - visual inspection
Insufficient sample for AL or G_s

Dames & Moore

GRADATION CURVE

Location N-142-93, at 45.0-47.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring N-142-93
Sample at 45-47 feet

	totals
Wt soil and dish	171
Dry soil & dish	143.1
Dish	43.7
wet soil	644.3
dish	11.3
dry total	494.3

Moisture Content = 28.1 %

SIEVE ANALYSIS

Total sample dry = 494.3 g

Weight of sample split #4 53.4 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	37.62	92.39%	92.4	19.0
3/8 inch	55.31	88.81%	88.8	9.5
# 4	58.89	88.09%	88.1	4.8
# 10	0.82	86.73%	86.7	2.0
# 20	1.33	85.89%	85.9	0.85
# 40	1.63	85.40%	85.4	0.43
# 60	1.89	84.97%	85.0	0.25
# 100	2.25	84.37%	84.4	0.15
# 200	5.25	79.43%	79.4	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/23/94

BORING N-142 SAMPLE 93 DEPTH 45-47' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	644.3
WT. OF ~~RINGS~~ DGh	11.3
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/29 ⊕ #4	1/29 ⊖ #4	
PAN	A22	300	GT-27	
WT. OF PAN & WET SOIL	171.0	381.9	172.5	
WT. OF PAN & DRY SOIL	143.1	341.4	162.2	
WT. OF MOISTURE				
WT. OF PAN	43.7	115.3	108.9	
WT. OF DRY SOIL				
MOISTURE CONTENT %	28.1	—	19.3	

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE 494.3

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		37.62			
☐			3/8"		55.31			
☑			#4		50.89			
☐			#10		0.82			
☐			#20		1.33			
☑			#40		1.63			
☐			#60		1.89			
☐			#100		2.25			
☐			#200		5.25			
☐								
☐								

(4)

NOTE: $G_s = 2.71$

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Watson

LOCATION TEAD-N REF

BORING N-142 SAMPLE 92 DEPTH 45-47'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

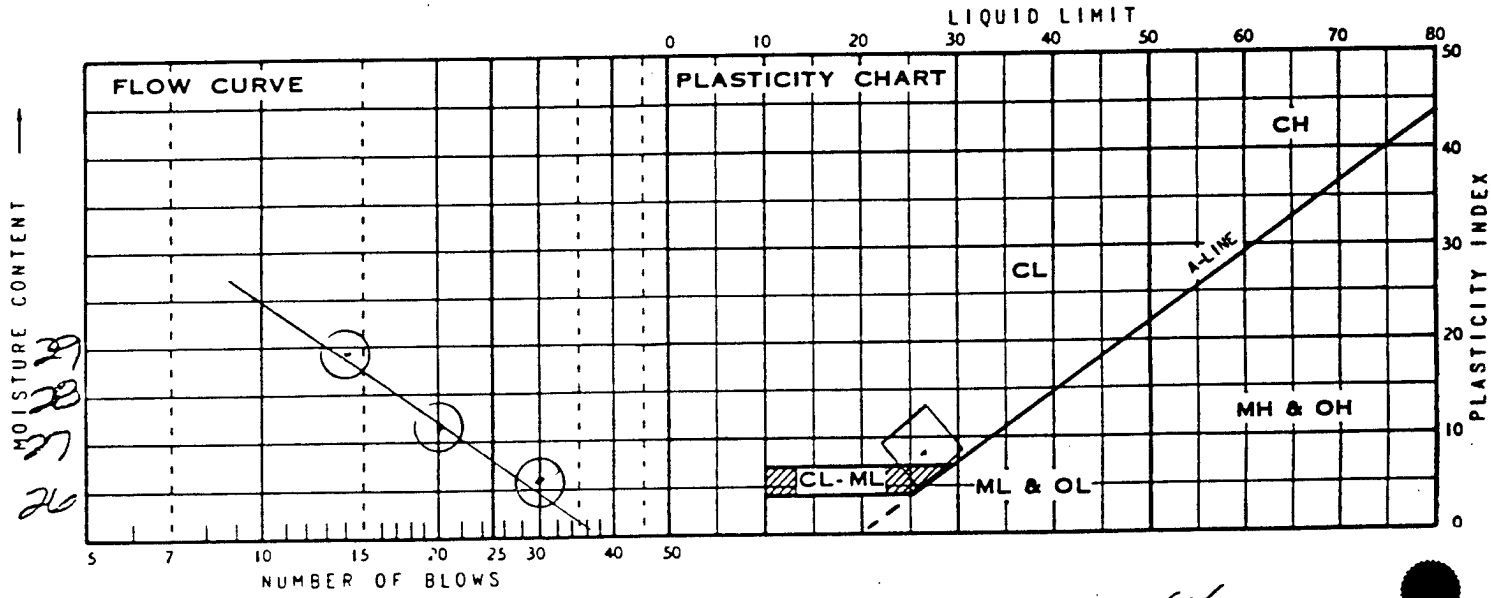
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY VAF 2/19/94

DETERMINATION	1	2	3	4	5	6
DISH	11	29				
WT OF DISH + WET SOIL	13.23	15.45				
WT OF DISH + DRY SOIL	11.34	13.19	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	19.01	19.17	AV=19			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	111	103	74			
NUMBER OF BLOWS	30	20	14			
WT OF DISH + WET SOIL	10.63	11.49	11.59			
WT OF DISH + DRY SOIL	8.72	9.33	9.30	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	26.09	27.24	28.99			



SUMMARY

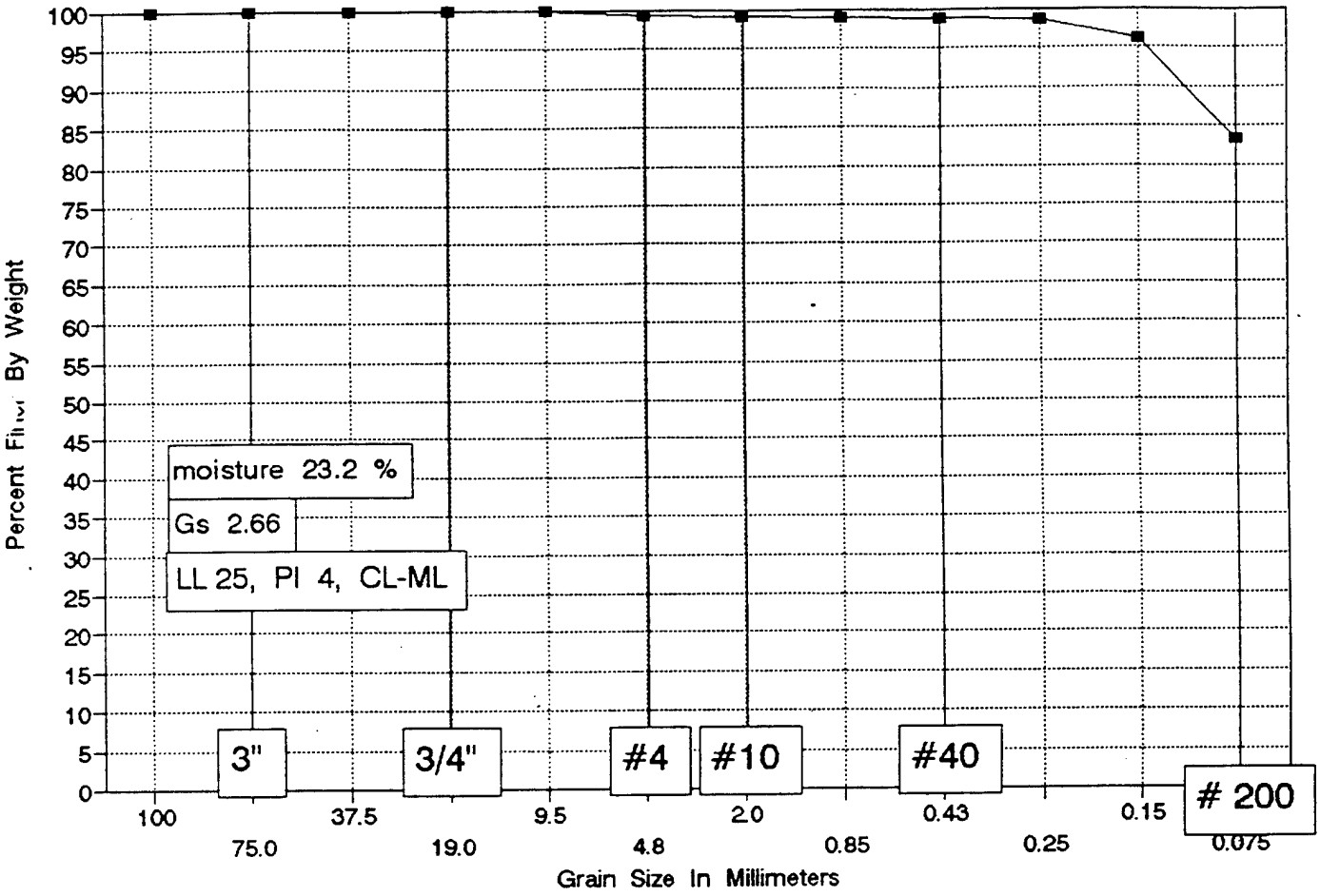
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DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		27	19	8	CL	

DAMES & MOORE

GRADATION CURVE

Location N-142-93, at 70.0-72.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring N-142-93
Sample at 70-72 feet

	totals
Wt soil and dish	146.8
Dry soil & dish	127.4
Dish	43.8
wet soil	605.1
dish	18.6
dry total	476.0

Moisture Content = 23.2 %

SIEVE ANALYSIS

Total sample dry = 476.0 g

Weight of sample split #4 136.1 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	0	100.00%	100.0	9.5
# 4	3.19	99.33%	99.3	4.8
# 10	0.29	99.12%	99.1	2.0
# 20	0.43	99.02%	99.0	0.85
# 40	0.64	98.86%	98.9	0.43
# 60	1.06	98.56%	98.6	0.25
# 100	4.38	96.13%	96.1	0.15
# 200	22.03	83.25%	83.3	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/28/94

BORING N-142 SAMPLE 93 DEPTH 70-72' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	605.1
WT. OF ~~RINGS~~ DISH	18.6
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/29 #4	1/29 #4	
PAN	L-6	217	GT-26	
WT. OF PAN & WET SOIL	146.8	140.2	267.6	
WT. OF PAN & DRY SOIL	127.4	136.1	247.2	
WT. OF MOISTURE				
WT. OF PAN	43.8	115.7	111.1	
WT. OF DRY SOIL				
MOISTURE CONTENT %	23.2	—	15.0	

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE 476.0

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"					
☐			3/8"		0			
☑			#4		3.19			
☐			#10		0.29			
☐			#20		0.43			
☑			#40		0.64			
☐			#60		1.06			
☐			#100		4.38			
☐			#200		22.03			
☐								
☐								

(5)

NOTE: G_s 2.66 LL25 PI 4 A-ML

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATOPY CLASSIFICATION _____

CLIENT/OWNER Montgomery Watson

LOCATION TEAD-N RFI

BORING N-142 SAMPLE 93 DEPTH 70-72'

FIELD DENSITY BY _____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

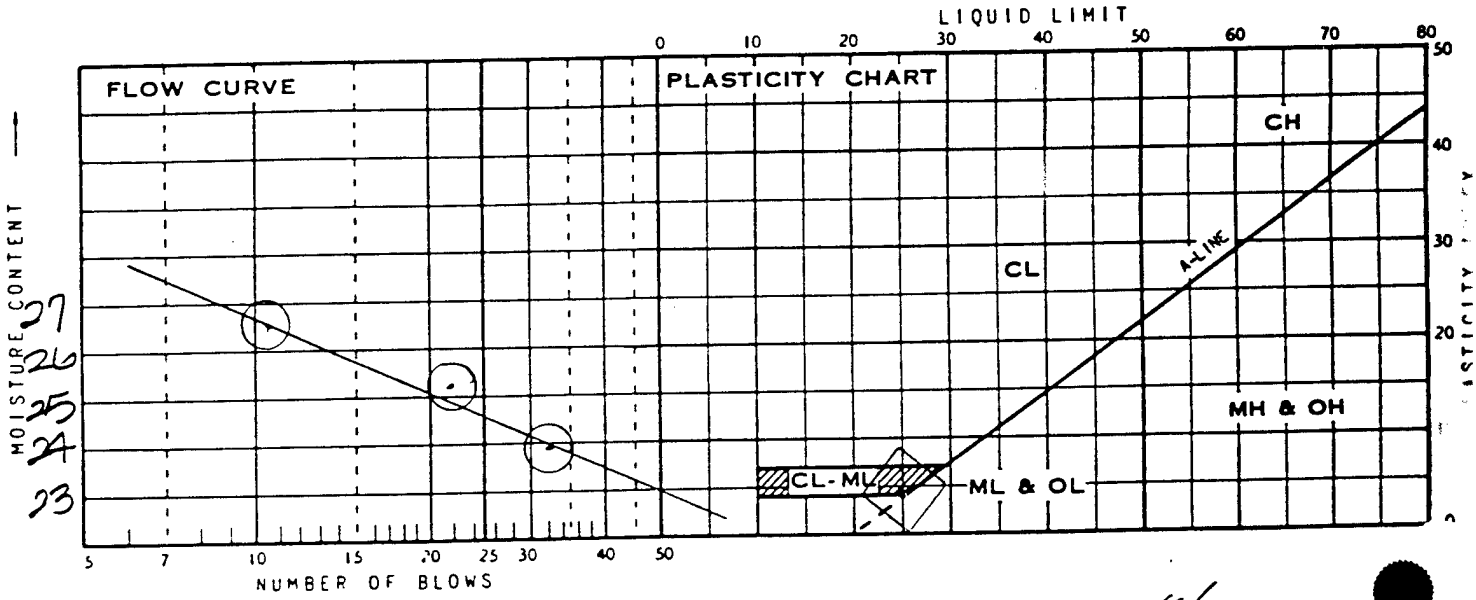
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY VAF 2.19.94

DETERMINATION	1	2	3	4	5	6
DISH	AL 72	6				
WT OF DISH + WET SOIL	14.65	16.20				
WT OF DISH + DRY SOIL	12.33	13.62	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	21.23	21.11	AV = 21			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	AL 124	AL 111	AL 83			
NUMBER OF BLOWS	33	23	11			
WT OF DISH + WET SOIL	13.15	15.86	11.10			
WT OF DISH + DRY SOIL	10.88	12.96	9.06	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	23.95	25.09	26.63			



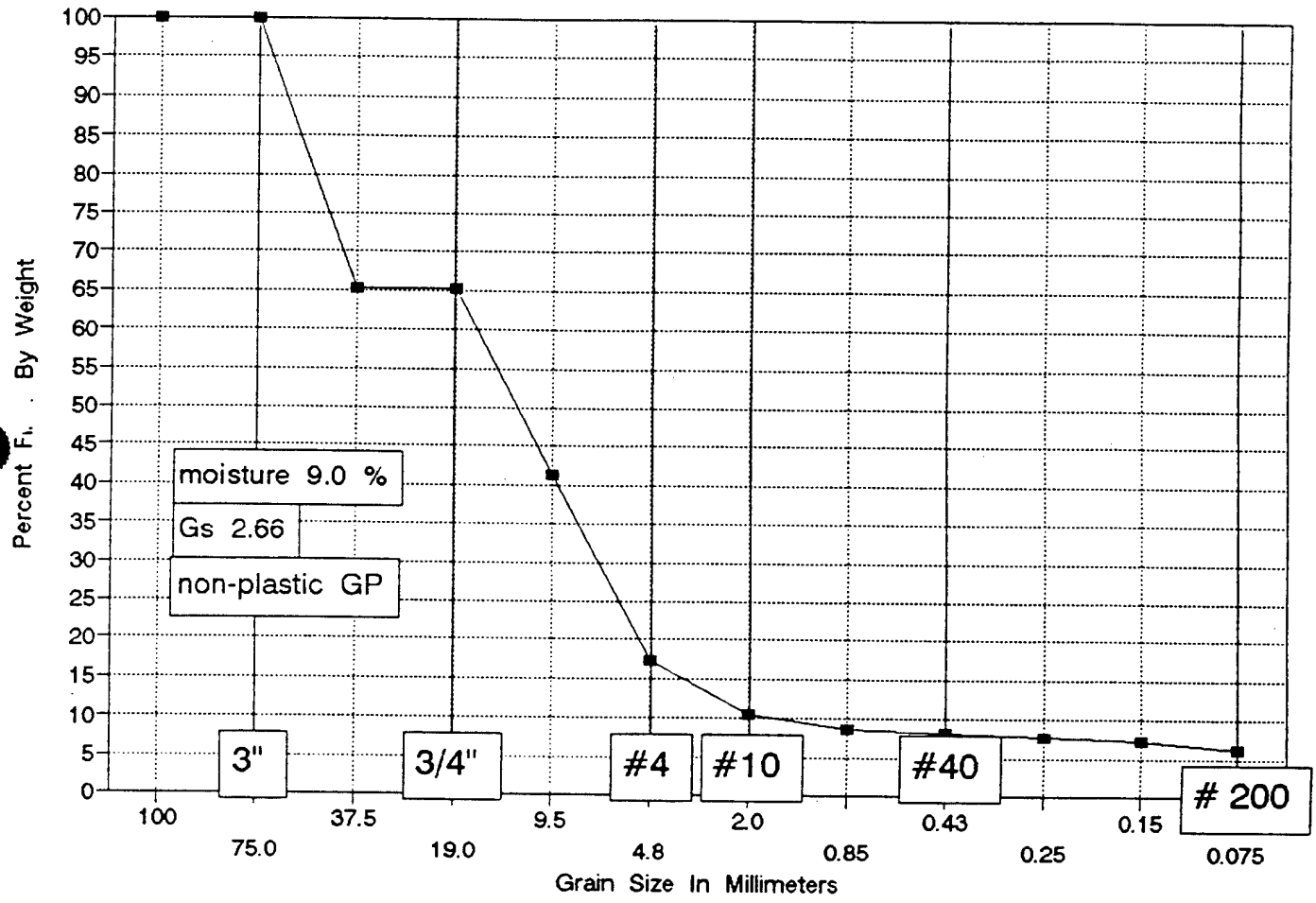
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		25	21	4	CL-ML	

DAMES & MOORE

GRADATION CURVE

Location N-142-93, at 80.0-82.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring N-142-93
Sample at 80-82 feet

	totals
Wt soil and dish	110.4
Dry soil & dish	104.9
Dish	43.6
wet soil	645.2
dish	18.5
dry total	575.1

Moisture Content = 9.0 %

SIEVE ANALYSIS

Total sample dry = 575.1 g

Weight of sample split #4 38.6 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	200.1	65.21%	65.2	37.5
3/4 inch	200.1	65.21%	65.2	19.0
3/8 inch	337.9	41.25%	41.2	9.5
# 4	475.6	17.30%	17.3	4.8
# 10	15.29	10.45%	10.4	2.0
# 20	19.29	8.66%	8.7	0.85
# 40	20.66	8.04%	8.0	0.43
# 60	21.49	7.67%	7.7	0.25
# 100	22.44	7.24%	7.2	0.15
# 200	24.9	6.14%	6.1	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/28/94

BORING N-142 SAMPLE 93 DEPTH 80-82' BY LAF

	total
JAR ~~DENSITY~~	WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	645.2
WT. OF ~~RINGS~~ DISH	180.5
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	mc	④ #4	⑤ #4	
PAN	L-8	CT-23	312	
WT. OF PAN & WET SOIL	110.4	632.2	151.6	
WT. OF PAN & DRY SOIL	104.9	628.6	151.0	
WT. OF MOISTURE				
WT. OF PAN	43.6	110.9	112.4	
WT. OF DRY SOIL				
MOISTURE CONTENT %	9.0			

1/29 1/29

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE 575.1

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"		0			
☐			1-1/2"		200.10			
☐			3/4"	0	200.10			
☐			3/8"		337.9			
☑			#4		475.6			
☐			#10		15.29			
☐			#20		19.29			
☑			#40		20.66			
☐			#60		21.49			
☐			#100		22.44			
☐			#200		24.90			
☐								
☐								

(6)

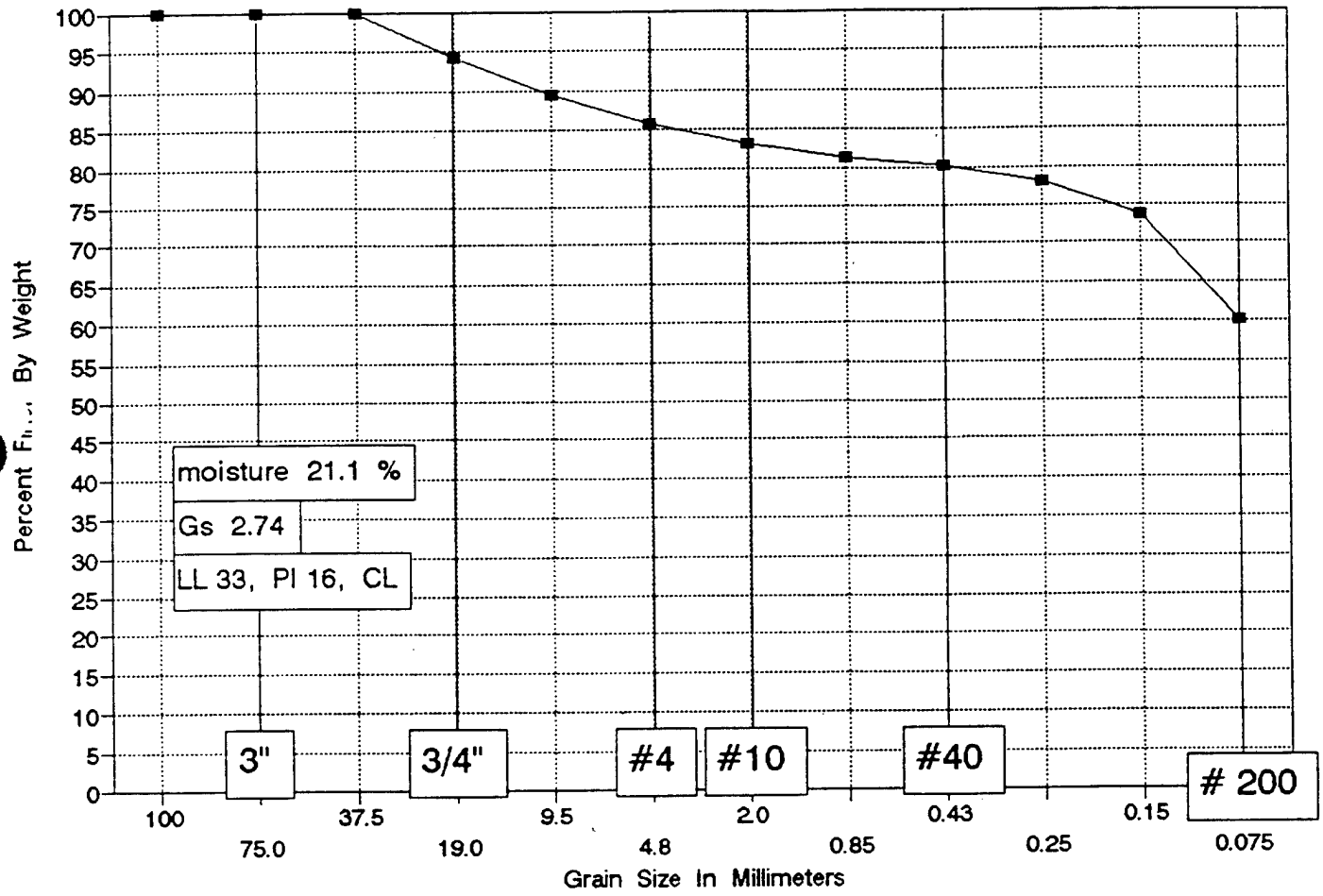
NOTE: Insufficient sample for AL $G_s = 2.66$

Non-plastic by visual inspection

Dames & Moore

GRADATION CURVE

Location N-142-93, at 90.0-92.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring N-142-93
Sample at 90-92 feet

	totals
Wt soil and dish	135.3
Dry soil & dish	119.3
Dish	43.6
wet soil	591.1
dish	18.5
dry total	472.7

Moisture Content = 21.1 %

SIEVE ANALYSIS

Total sample dry = 472.7 g

Weight of sample split #4 78.7 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	27.07	94.27%	94.3	19.0
3/8 inch	50.09	89.40%	89.4	9.5
# 4	67.34	85.75%	85.8	4.8
# 10	2.45	83.08%	83.1	2.0
# 20	4.07	81.32%	81.3	0.85
# 40	5.24	80.04%	80.0	0.43
# 60	7.09	78.03%	78.0	0.25
# 100	11.12	73.64%	73.6	0.15
# 200	23.44	60.21%	60.2	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/28/94

BORING N-142 SAMPLE 93 DEPTH 90-92' BY LaF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	591.1
WT. OF ~~RINGS~~ DKh	185
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/29 Ⓐ #4	1/29 Ⓑ #4	
PAN	A-4	309	202	
WT. OF PAN & WET SOIL	135.3	270.4	197.1	
WT. OF PAN & DRY SOIL	119.3	260.9	189.3	
WT. OF MOISTURE				
WT. OF PAN	43.6	109.7	110.6	
WT. OF DRY SOIL				
MOISTURE CONTENT %	21.1	—	9.9	

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		27.07			
☐			3/8"		50.09			
☑			#4		67.34			
☐			#10		2.45			
☐			#20		4.07			
☑			#40		5.24			
☐			#60		7.09			
☐			#100		11.12			
☐			#200		23.44			
☐								
☐								

(7)

NOTE: $G_s = 2.74$

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Watson

LOCATION TEAD-N REI

BORING N-142 SAMPLE 93 DEPTH 90-92'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

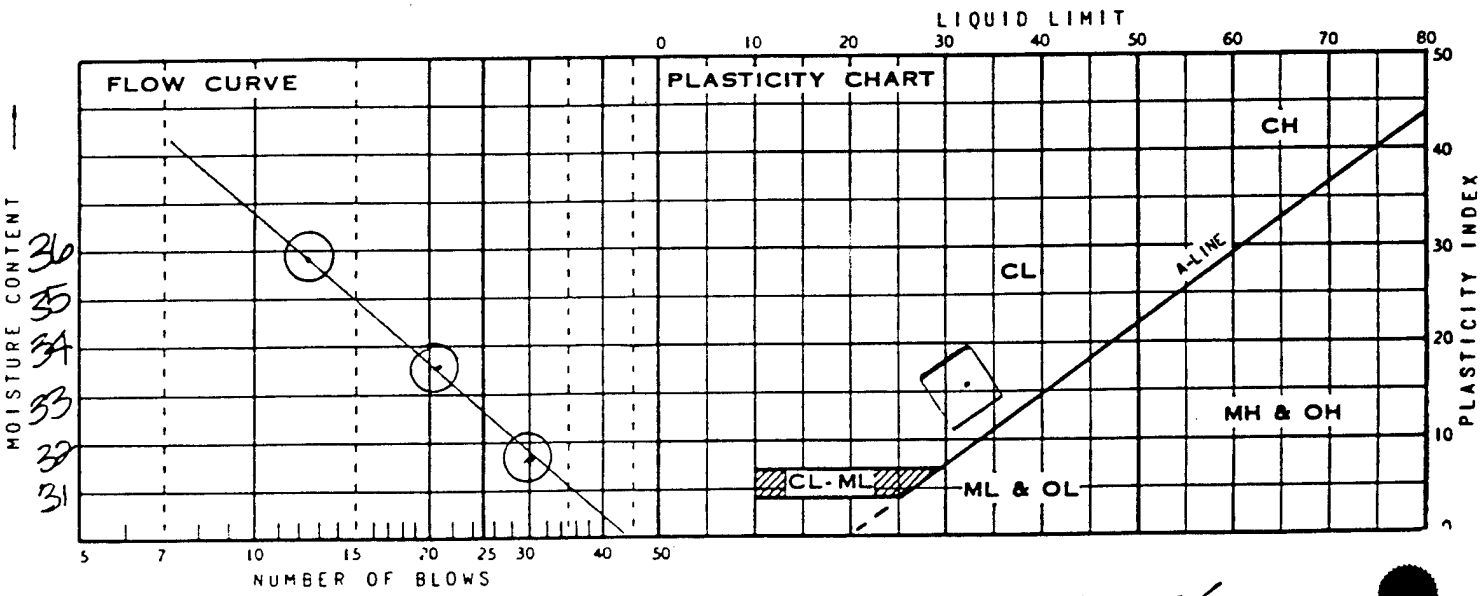
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY LAF 1/31/94

DETERMINATION	1	2	3	4	5	6
DISH	18	50				
WT OF DISH + WET SOIL	12.58	14.36				
WT OF DISH + DRY SOIL	10.93	12.46	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	17.31	17.18	AVG = 17			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	134	116	AL 117			
NUMBER OF BLOWS	30	21	13			
WT OF DISH + WET SOIL	10.11	10.14	10.41			
WT OF DISH + DRY SOIL	8.01	7.94	8.05	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	31.77	33.64	35.94			



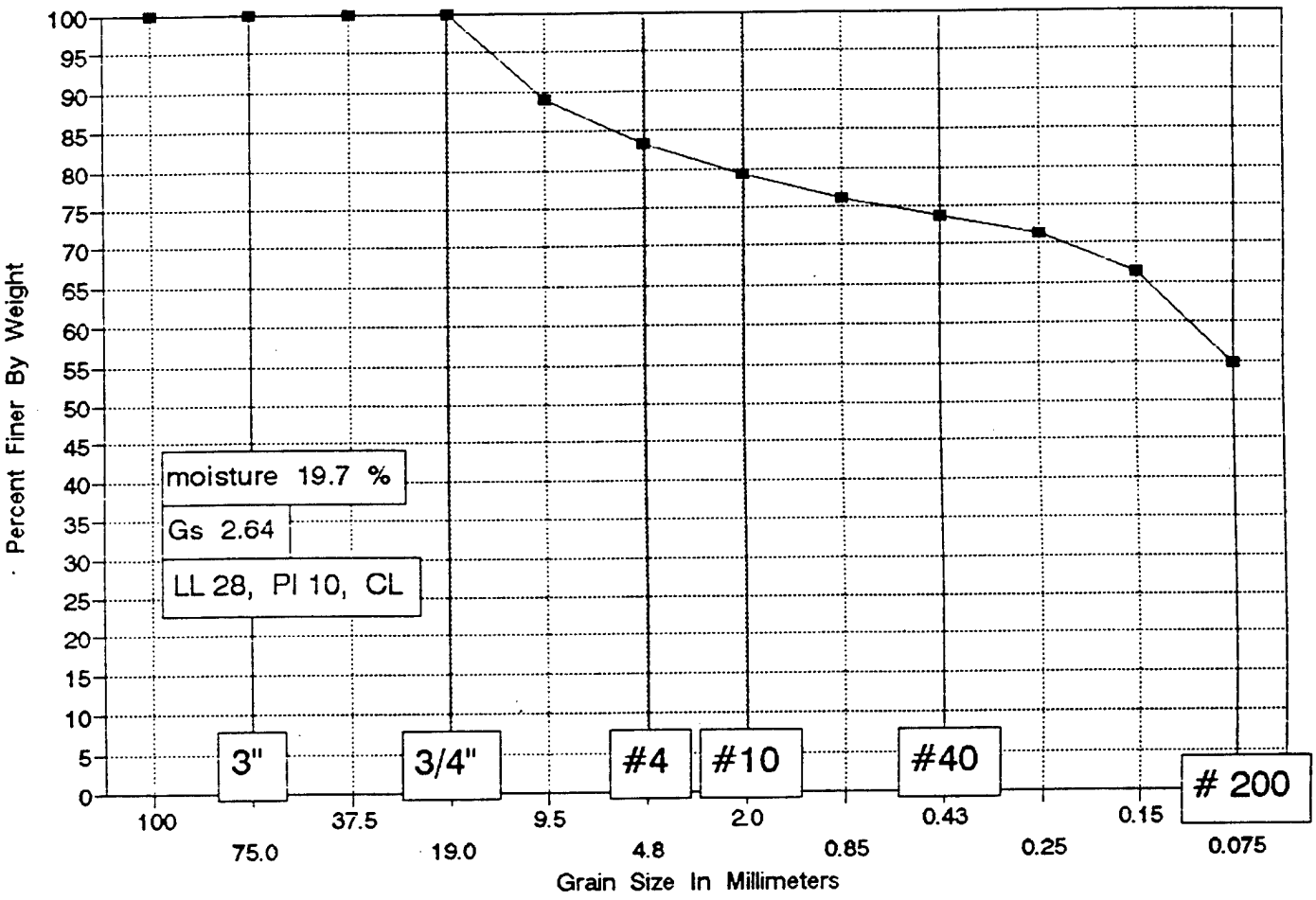
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		33	17	16	CL	

DAMES & MOORE

GRADATION CURVE

Location N-143-93, at 0.0-2.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring N-143-93
Sample at 0-2 feet

Moisture Content = 19.7 %

	totals
Wt soil and dish	133.7
Dry soil & dish	118.8
Dish	43.3
wet soil	461.2
dish	11.5
dry total	375.6

SIEVE ANALYSIS

Total sample dry = 375.6 g

Weight of sample split #4 72.5 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	40.96	89.09%	89.1	9.5
# 4	62.89	83.26%	83.3	4.8
# 10	3.59	79.13%	79.1	2.0
# 20	6.27	76.06%	76.1	0.85
# 40	8.47	73.53%	73.5	0.43
# 60	10.42	71.29%	71.3	0.25
# 100	14.82	66.24%	66.2	0.15
# 200	24.88	54.68%	54.7	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/28/94

BORING N-143 SAMPLE 93 DEPTH 0-2' BY LAF

JAR ~~DENSITY~~	Total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	461.2
WT. OF ~~RINGS~~ DISH	11.5
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	⊕ #4 1/29	⊖ #4 1/29	
PAN	L-7	205	82	
WT. OF PAN & WET SOIL	133.7	229.8	188.2	
WT. OF PAN & DRY SOIL	118.8	224.2	180.6	
WT. OF MOISTURE				
WT. OF PAN	43.3	111.8	109.1	
WT. OF DRY SOIL				
MOISTURE CONTENT %	19.7	—	10.5	

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"		0			
☐			3/8"		40.96			
☑			#4		62.89			
☐			#10		3.59			
☐			#20		6.27			
☑			#40		8.47			
☐			#60		10.42			
☐			#100		14.82			
☐			#200		24.88			
☐								
☐								

(8)

NOTE: $G_s = 2.64$

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Watson

LOCATION TEAD-N RFI

BORING N-143 SAMPLE 93 DEPTH 0-2'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

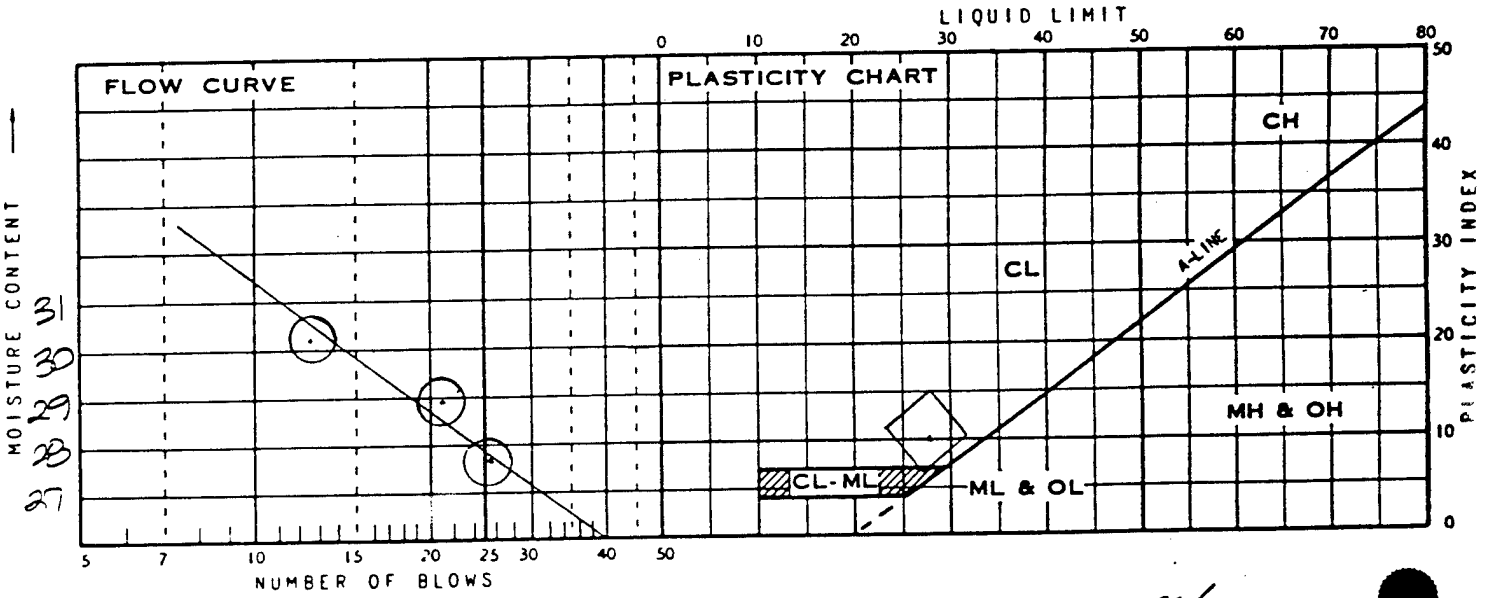
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY LAF 2-19-94

DETERMINATION	1	2	3	4	5	6
DISH	109	36				
WT OF DISH + WET SOIL	14.17	13.98				
WT OF DISH + DRY SOIL	12.22	11.38	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	18.02	18.04	AVG = 18			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	61	AL127	AL98			
NUMBER OF BLOWS	26	22	13			
WT OF DISH + WET SOIL	12.54	12.37	12.27			
WT OF DISH + DRY SOIL	10.12	9.91	9.75	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	27.75	28.91	30.18			



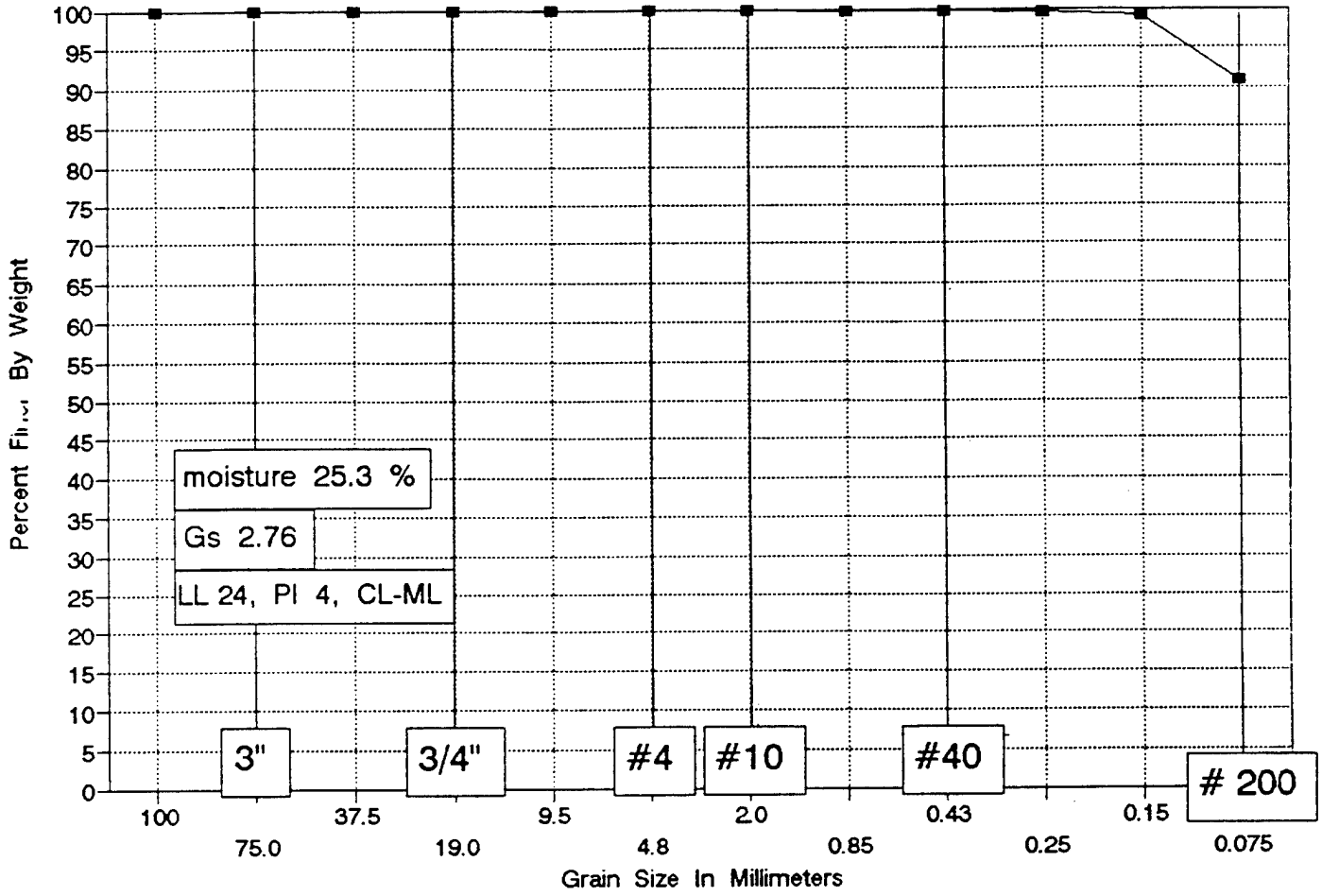
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		28	18	10	CL	

DAMES & MOORE

GRADATION CURVE

Location N-143-93, at 15.0-17.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring N-143-93
Sample at 15-17 feet

	totals
Wt soil and dish	153.3
Dry soil & dish	131.1
Dish	43.3
wet soil	597.2
dish	18.4
dry total	462.0

Moisture Content = 25.3 %

SIEVE ANALYSIS

Total sample dry = 462.0 g

Weight of sample split #4 75 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	0	100.00%	100.0	9.5
# 4	0.45	99.90%	99.9	4.8
# 10	0	99.90%	99.9	2.0
# 20	0.08	99.80%	99.8	0.85
# 40	0.16	99.69%	99.7	0.43
# 60	0.31	99.49%	99.5	0.25
# 100	0.6	99.10%	99.1	0.15
# 200	6.7	90.98%	91.0	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/26/94

BORING N-143 SAMPLE 93 DEPTH 15-17' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	597.2
WT. OF ~~RINGS~~ DKh	18.4
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/29 A #4	1/29 A #4	
PAN	A-8	206	GT-29	
WT. OF PAN & WET SOIL	153.3	192.8	194.9	
WT. OF PAN & DRY SOIL	131.1	181.3	184.5	
WT. OF MOISTURE				
WT. OF PAN	43.3	112.1	109.5	
WT. OF DRY SOIL				
MOISTURE CONTENT %	25.3	—	—	

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE 462.0

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"					
☐			3/8"		~~0~~			
☑			#4		0.45			
☐			#10		~~0~~			
☐			#20		0.08			
☑			#40		0.16			
☐			#60		0.31			
☐			#100		0.60			
☐			#200		6.70			
☐								
☐								

(9)

NOTE: G_s 2.76

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER MONTGOMERY WATSON

LOCATION TEAD-N RFI

BORING N-143 SAMPLE 93 DEPTH 15-17'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

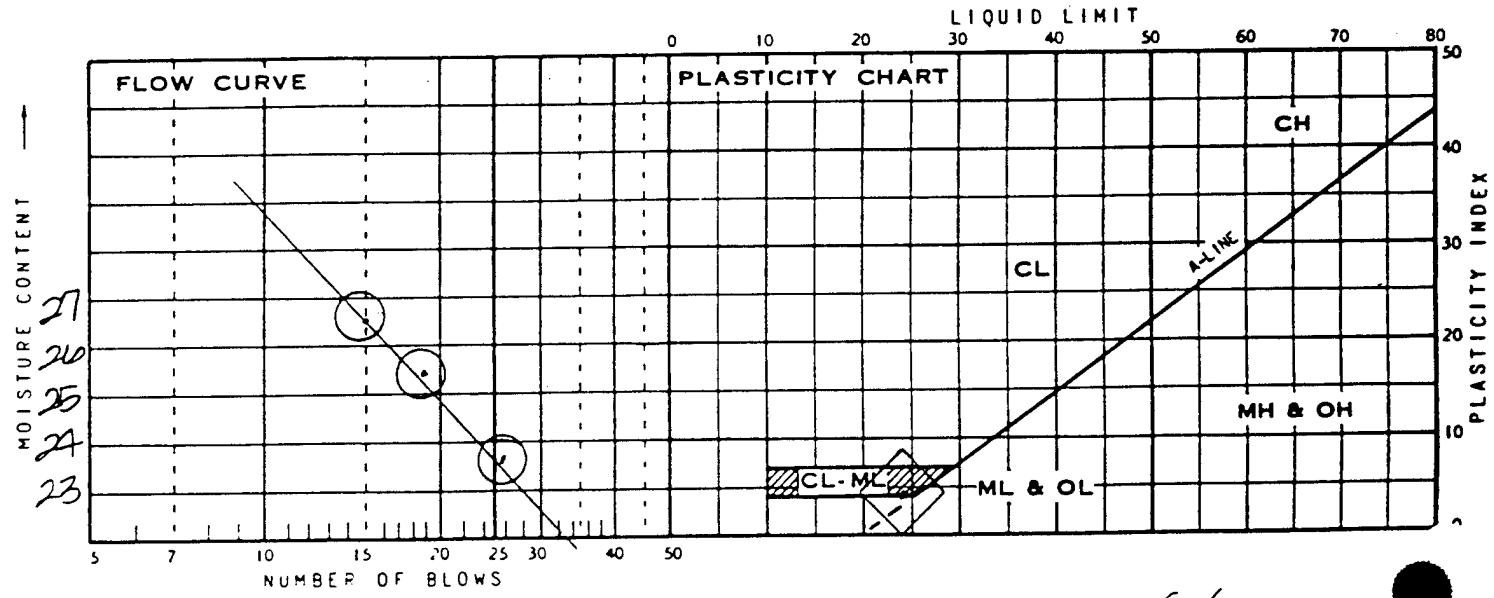
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY LAE 3294

DETERMINATION	1	2	3	4	5	6
DISH	46	AL 117				
WT OF DISH + WET SOIL	13.78	15.99				
WT OF DISH + DRY SOIL	11.74	13.58	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	19.73	19.79	AV = 20			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	40	78	AL 123			
NUMBER OF BLOWS	26	19	15			
WT OF DISH + WET SOIL	10.80	11.74	11.03			
WT OF DISH + DRY SOIL	8.99	9.64	9.01	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	23.85	25.49	26.54			



SUMMARY

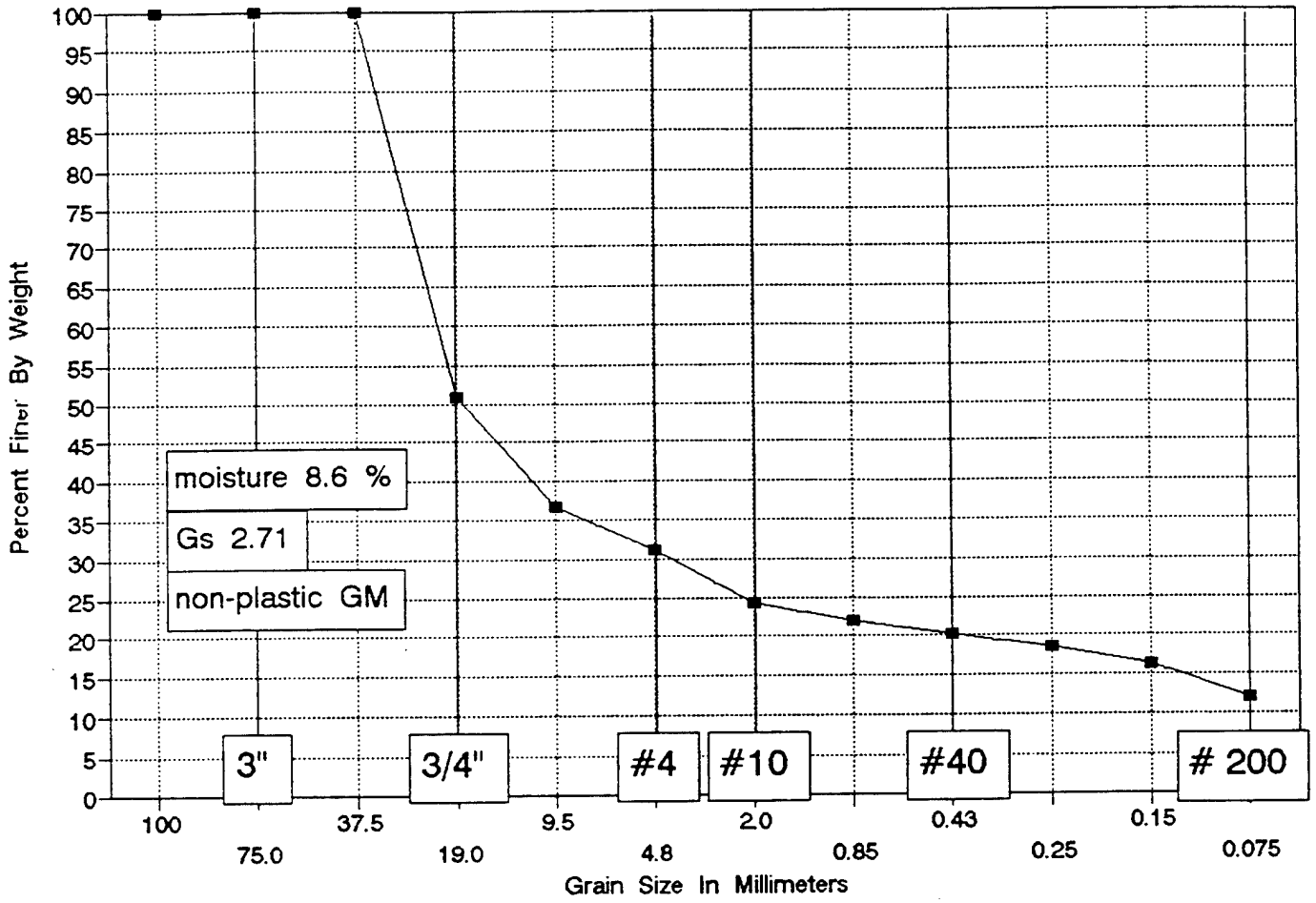
Good

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		24	20	4	CL-ML	

DAMES & MOORE

GRADATION CURVE

Location N-143-93, at 20.0-22.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring N-143-93
Sample at 20-22 feet

	totals
Wt soil and dish	75
Dry soil & dish	72.5
Dish	43.4
wet soil	252.5
dish	10.8
dry total	222.6

Moisture Content = 8.6 %

SIEVE ANALYSIS

Total sample dry = 222.6 g

Weight of sample split #4 27 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	109.39	50.85%	50.9	19.0
3/8 inch	141.11	36.60%	36.6	9.5
# 4	153.26	31.14%	31.1	4.8
# 10	5.87	24.37%	24.4	2.0
# 20	7.97	21.95%	22.0	0.85
# 40	9.45	20.24%	20.2	0.43
# 60	10.93	18.54%	18.5	0.25
# 100	12.9	16.26%	16.3	0.15
# 200	16.59	12.01%	12.0	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/28/94

BORING N-143 SAMPLE 93 DEPTH 20-22' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	252.5
WT. OF ~~RINGS~~ Dish	10.8
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/29 ⊕#4	1/29 ⊖#4	
PAN	L-5	122	310	
WT. OF PAN & WET SOIL	75.0	277.5	138.2	
WT. OF PAN & DRY SOIL	72.5	275.6	136.9	
WT. OF MOISTURE				
WT. OF PAN	43.4	107.3	109.9	
WT. OF DRY SOIL				
MOISTURE CONTENT %	8.6			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE 222.6

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		109.39			
☐			3/8"		141.11			
☑			#4		153.26			
☐			#10		5.87			
☐			#20		7.97			
☑			#40		9.45			
☐			#60		10.93			
☐			#100		12.90			
☐			#200		16.59			
☐								
☐								

(10)

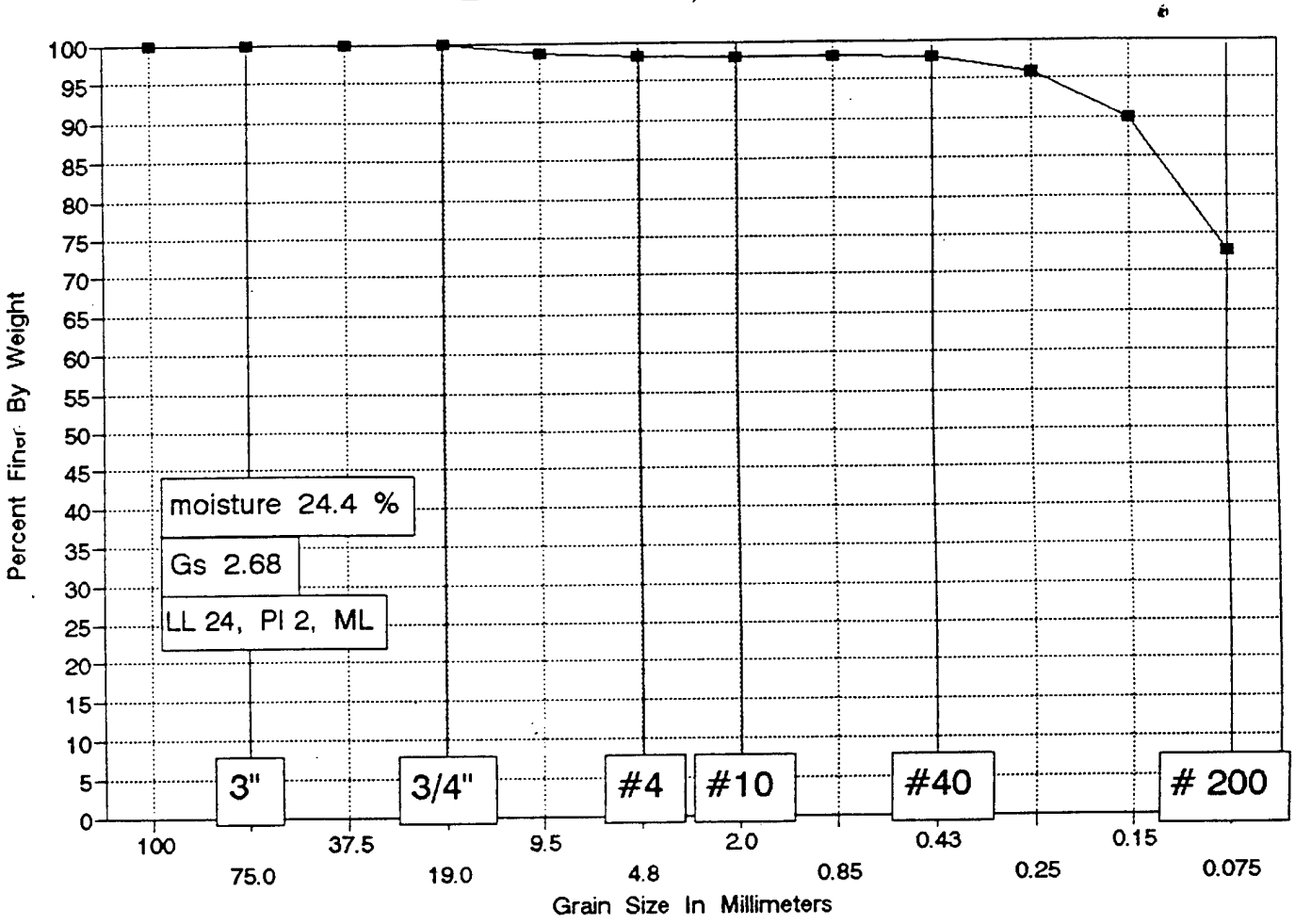
NOTE: insufficient sample to perform AL G_s=2.71

Non-plastic by visual inspection Est

Dames & Moore

GRADATION CURVE

Location N-143-93, at 40.0-41.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring N-143-93
Sample at 40-41 feet

Moisture Content = 24.4 %

	totals
Wt soil and dish	155.6
Dry soil & dish	133.6
Dish	43.5
wet soil	671.2
dish	105.2
dry total	454.9

SIEVE ANALYSIS

Total sample dry = 454.9 g

Weight of sample split #4 114.7 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	6.58	98.55%	98.6	9.5
# 4	8.35	98.16%	98.2	4.8
# 10	0.06	98.11%	98.1	2.0
# 20	0.2	97.99%	98.0	0.85
# 40	0.46	97.77%	97.8	0.43
# 60	2.84	95.73%	95.7	0.25
# 100	9.62	89.93%	89.9	0.15
# 200	29.69	72.75%	72.8	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/28/94

BORING N-143 SAMPLE 93 DEPTH 40-41' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	671.2
WT. OF ~~RINGS~~ DCh	105.2
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/29 ⓕ #4	1/29 ⓒ #4	
PAN	E10	304	318	
WT. OF PAN & WET SOIL	155.6	194.5	239.5	
WT. OF PAN & DRY SOIL	133.6	168.6	225.4	
WT. OF MOISTURE				
WT. OF PAN	43.5	111.4	110.7	
WT. OF DRY SOIL				
MOISTURE CONTENT %	24.4			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE 454.9

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"		0			
☐			3/8"		0.58			
☐			#4		8.35			
☑			#10		0.06			
☐			#20		0.20			
☐			#40		0.46			
☑			#60		2.84			
☐			#100		9.02			
☐			#200		29.69			
☐								
☐								

(11)

NOTE: $G_s = 2.68$

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Wilson

LOCATION TEAD-N REF

BORING N-143 SAMPLE 93 DEPTH 40-41'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

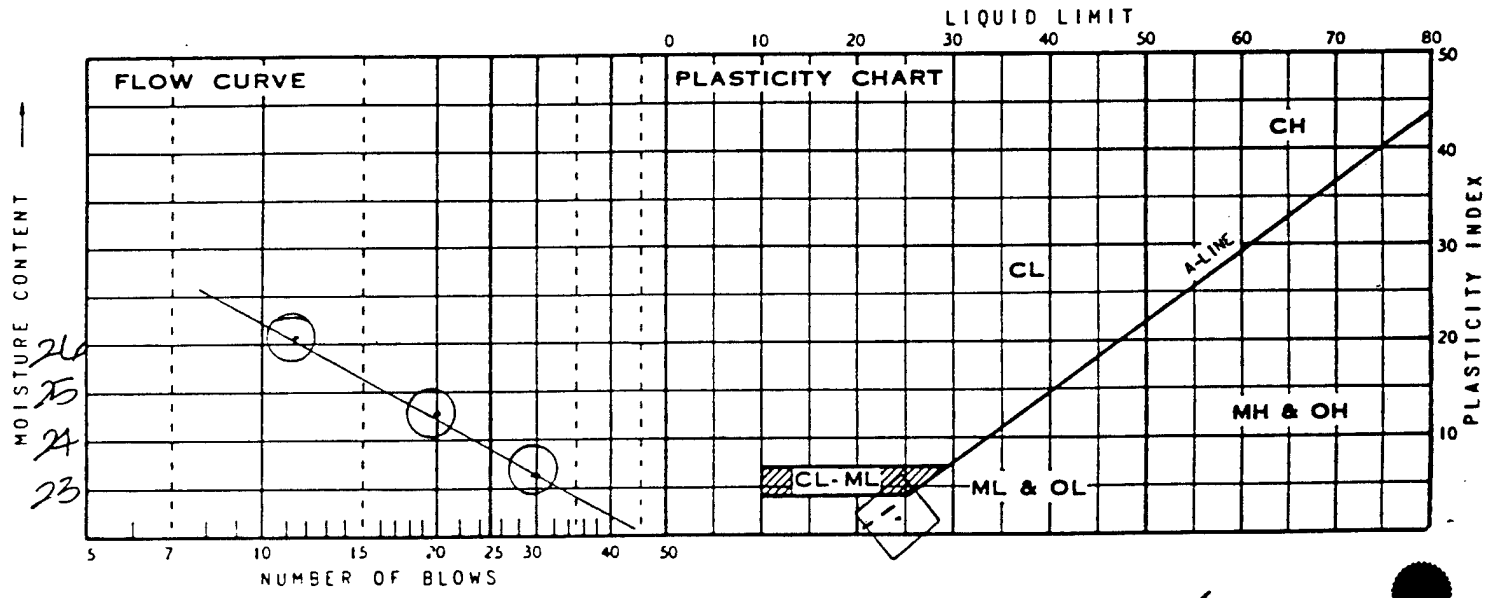
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY LAF 2294

DETERMINATION	1	2	3	4	5	6
DISH	AL 91	34				
WT OF DISH + WET SOIL	16.02	17.20				
WT OF DISH + DRY SOIL	13.41	14.37	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	21.73	21.82	AV = 22			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	AL 110	50	77			
NUMBER OF BLOWS	30	20	12			
WT OF DISH + WET SOIL	10.93	13.68	10.70			
WT OF DISH + DRY SOIL	9.13	11.25	8.78	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	23.29	24.67	26.02			



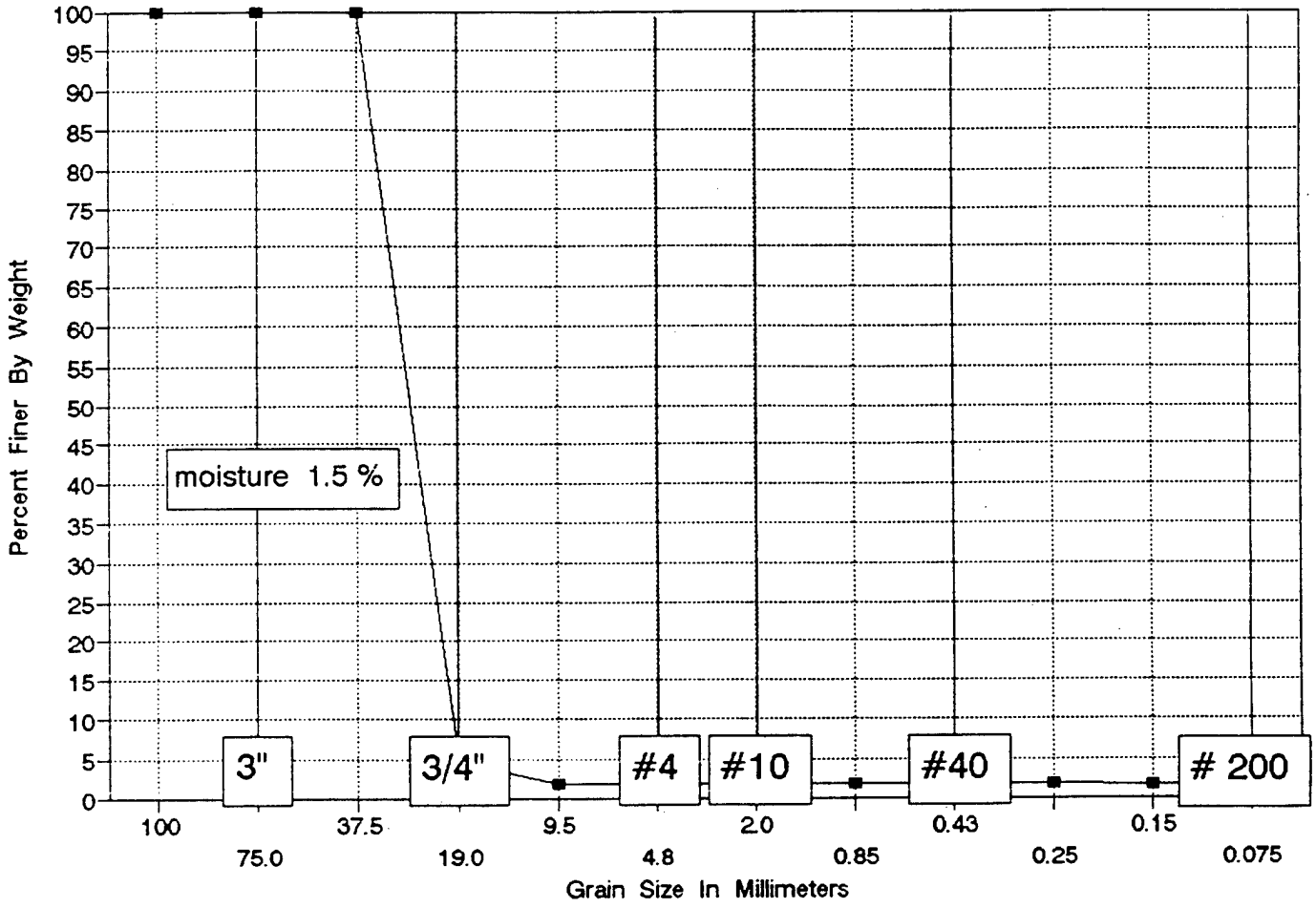
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		24	22	2	ML	

DAMES & MOORE

GRADATION CURVE

Location N-143-93, at 45.0-47.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring N-143-93
Sample at 45-47 feet

	totals
Wt soil and dish	104.1
Dry soil & dish	103.2
Dish	43.6
wet soil	551.4
dish	50.5
dry total	493.4

Moisture Content = 1.5 %

SIEVE ANALYSIS

Total sample dry = 493.4 g

Weight of sample split #4 1.6 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	471.2	4.51%	4.5	19.0
3/8 inch	484.8	1.75%	1.8	9.5
# 4	484.8	1.75%	1.8	4.8
# 10	0	1.75%	1.8	2.0
# 20	0.01	1.74%	1.7	0.85
# 40	0.03	1.72%	1.7	0.43
# 60	0.05	1.70%	1.7	0.25
# 100	0.11	1.63%	1.6	0.15
# 200	0.31	1.41%	1.4	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/28/94

BORING N-143 SAMPLE 93 DEPTH 45-47' BY LAF

total = all Rocks = 1/29 1/29

JAR ~~DENSITY~~ WT.	
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	551.4
WT. OF ~~RINGS~~ DISH	50.5
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	⊕#4	⊖#4	
PAN	G-41	210	E-3	
WT. OF PAN & WET SOIL	104.1	604.8	45.6	
WT. OF PAN & DRY SOIL	103.2	603.2	45.5	
WT. OF MOISTURE				
WT. OF PAN	43.6	111.4	43.9	
WT. OF DRY SOIL				
MOISTURE CONTENT %	1.5			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE 493.4

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		471.2			
☐			3/8"		484.8			
☑			#4	0	484.8			
☐			#10		0			
☐			#20		0.01			
☑			#40		0.03			
☐			#60		0.05			
☐			#100		0.11			
☐			#200		0.31			
☐								

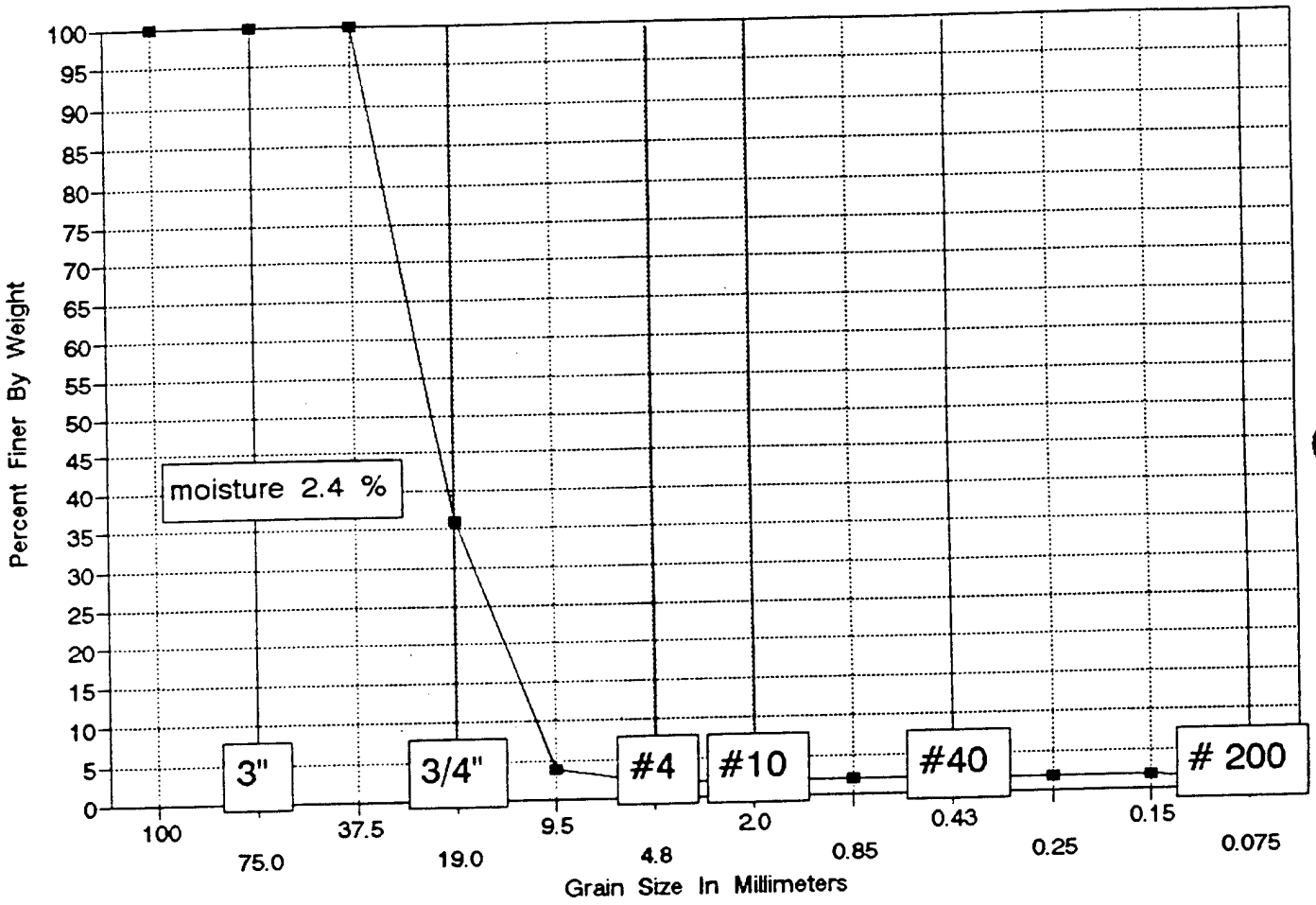
(12) Insufficient sample

NOTE: NO ⊖#4 material could not perform atterberg OR G_s

Dames & Moore

GRADATION CURVE

Location N-143-93, at 70.0-72.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring N-143-93
Sample at 70-72 feet

	totals
Wt soil and dish	152.5
Dry soil & dish	151.6
Dish	113.6
wet soil	531
dish	150.1
dry total	372.1

Moisture Content = 2.4 %

SIEVE ANALYSIS

Total sample dry = 372.1 g

Weight of sample split #4 0.8 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	238.58	35.88%	35.9	19.0
3/8 inch	358.2	3.73%	3.7	9.5
# 4	364.6	2.01%	2.0	4.8
# 10	0	2.01%	2.0	2.0
# 20	0.02	1.96%	2.0	0.85
# 40	0.03	1.94%	1.9	0.43
# 60	0.07	1.84%	1.8	0.25
# 100	0.13	1.69%	1.7	0.15
# 200	0.32	1.21%	1.2	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/26/94

BORING N-143 SAMPLE 93 DEPTH 70-72' BY LaF

JAR ~~DENSITY~~	Total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	531.0
WT. OF ~~RINGS~~ DRY	150.1
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/28 ~~#4~~	1/28 ~~#4~~	
PAN	M-23	GT-31	A-3	
WT. OF PAN & WET SOIL	152.5	483.2	44.5	
WT. OF PAN & DRY SOIL	151.6	481.5	44.5	
WT. OF MOISTURE				
WT. OF PAN	113.6	111.0	43.7	
WT. OF DRY SOIL				
MOISTURE CONTENT %	2.4	—	—	

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE 372.1

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		230.58			
☐			3/8"		358.2			
☑			#4		364.6			
☐			#10		0			
☐			#20	trace	0.02			
☐			#40		0.03			
☑			#60		0.07			
☐			#100		0.13			
☐			#200		0.32			
☐								
☐								

NOTE: (13) No Gs No AL

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Watson

LOCATION TEAD-N RFI

BORING N-143 SAMPLE 93 DEPTH 70-72'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

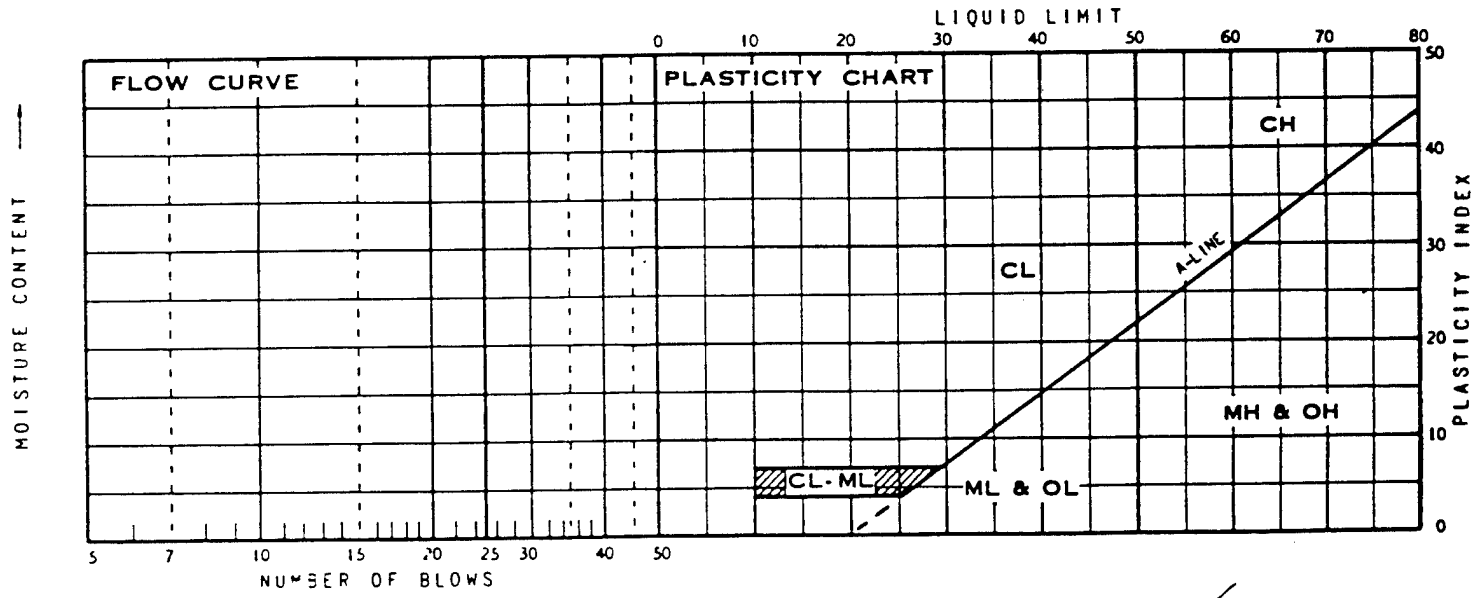
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY LAF 1.29.94

DETERMINATION	1	2	3	4	5	6
DISH		inadequate sample				
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	not enough @ #40 material			—	—
WT OF MOISTURE		to perform test				
WT OF DISH	—	rocks - see sieve			—	—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



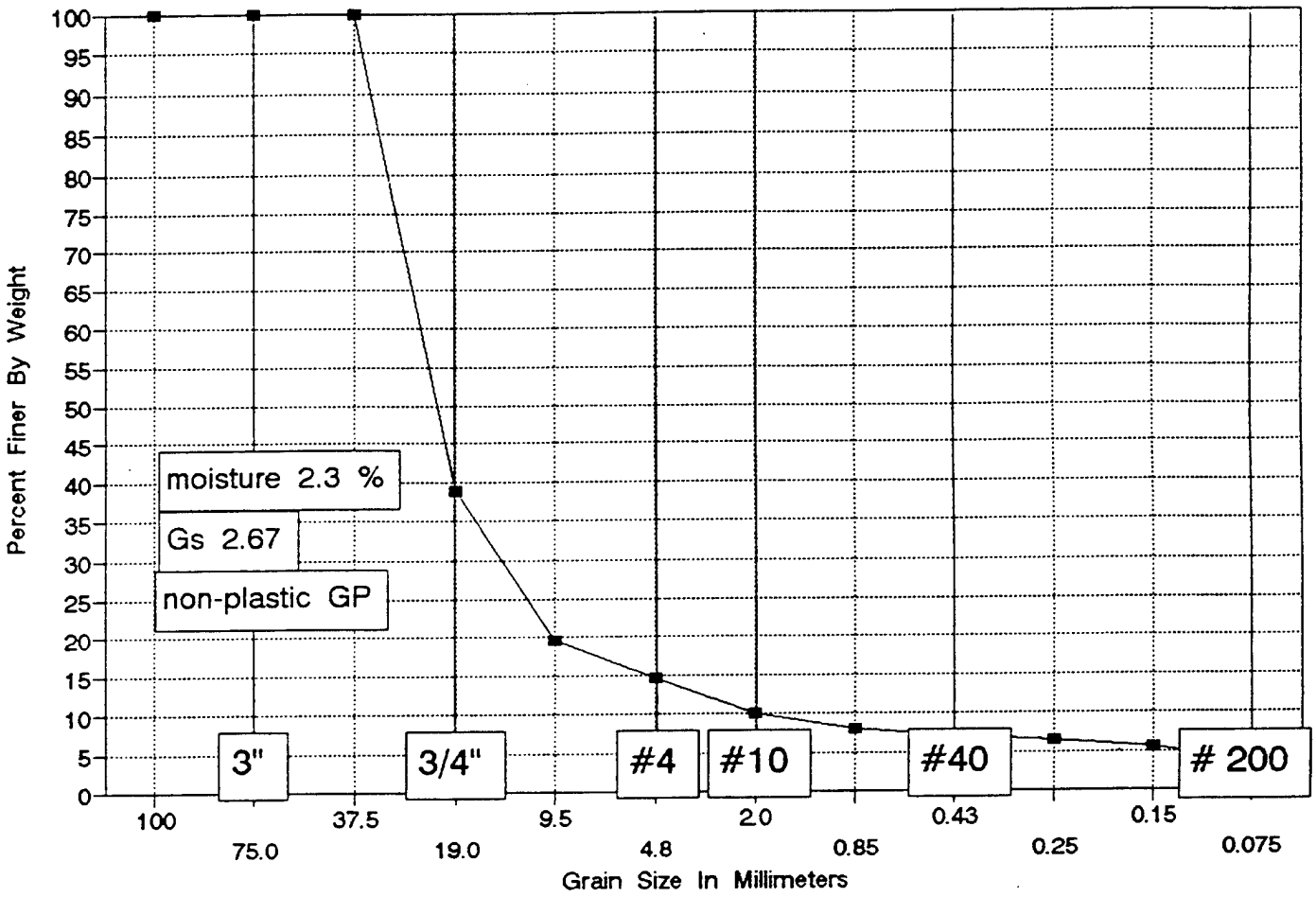
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NA	

DAMES & MOORE

GRADATION CURVE

Location N-143-93, at 85.0-87.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring N-143-93
Sample at 85-87 feet

Moisture Content = 2.3 %

	totals
Wt soil and dish	210.1
Dry soil & dish	207.9
Dish	112.5
wet soil	510.6
dish	10.7
dry total	488.6

SIEVE ANALYSIS

Total sample dry = 488.6 g

Weight of sample split #4 30.6 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	298.2	38.97%	39.0	19.0
3/8 inch	392	19.78%	19.8	9.5
# 4	416.7	14.72%	14.7	4.8
# 10	9.99	9.92%	9.9	2.0
# 20	14.17	7.90%	7.9	0.85
# 40	15.98	7.03%	7.0	0.43
# 60	17.41	6.35%	6.3	0.25
# 100	19.08	5.54%	5.5	0.15
# 200	22.78	3.76%	3.8	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/26/94

BORING N-143 SAMPLE 93 DEPTH 95-97' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	510.6
WT. OF ~~RINGS~~ DKh	10.7
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/28 A #4	1/28 B #4	
PAN	M-14	62	124	
WT. OF PAN & WET SOIL	210.1	538.0	143.0	
WT. OF PAN & DRY SOIL	207.9	536.2	142.5	
WT. OF MOISTURE				
WT. OF PAN	112.5	110.1	111.9	
WT. OF DRY SOIL				
MOISTURE CONTENT %	2.3			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE 488.6

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		298.2			
☐			3/8"		392.0			
☐			#4		416.7			
☑			#10		9.99			
☐			#20		14.17			
☐			#40		15.98			
☑			#60		17.41			
☐			#100		19.08			
☐			#200		22.78			
☐								
☐								

(14)

NOTE: $G_s = 2.67$

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Watson

LOCATION TEAD-N REI

BORING N-143 SAMPLE 93 DEPTH 85-87'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

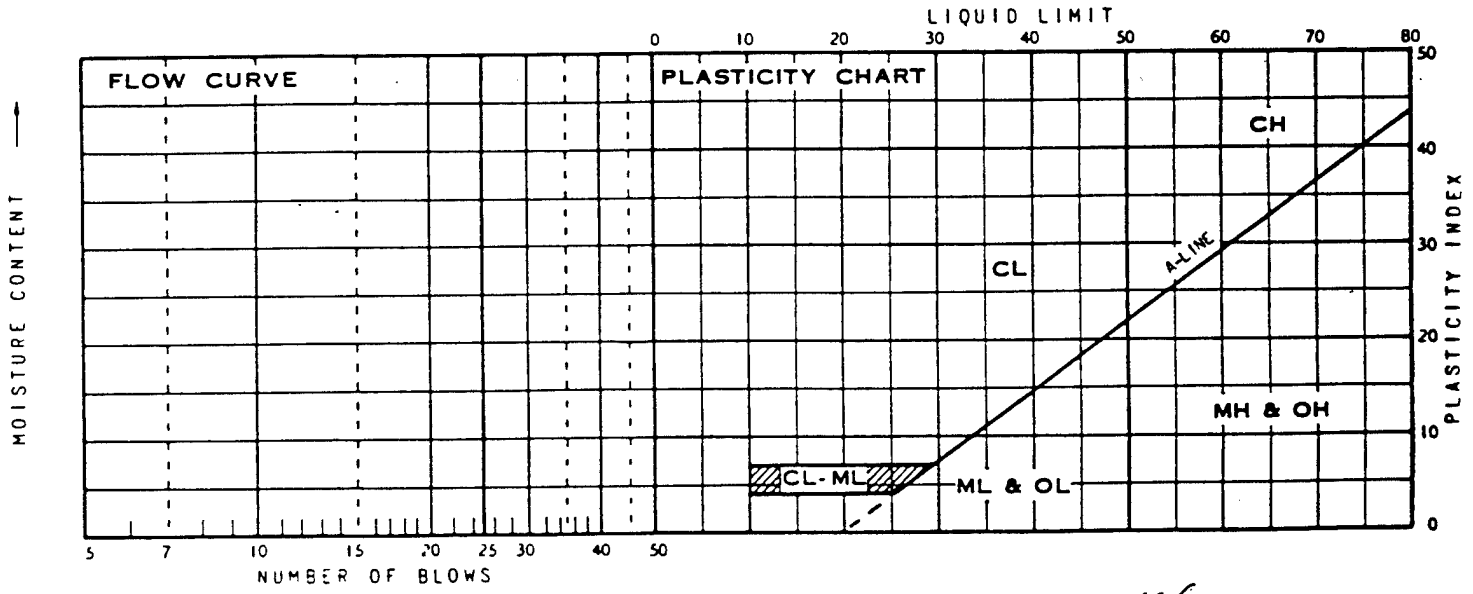
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY LAF 12/29/94

DETERMINATION	1	2	3	4	5	6
DISH		could not thread				
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



SUMMARY

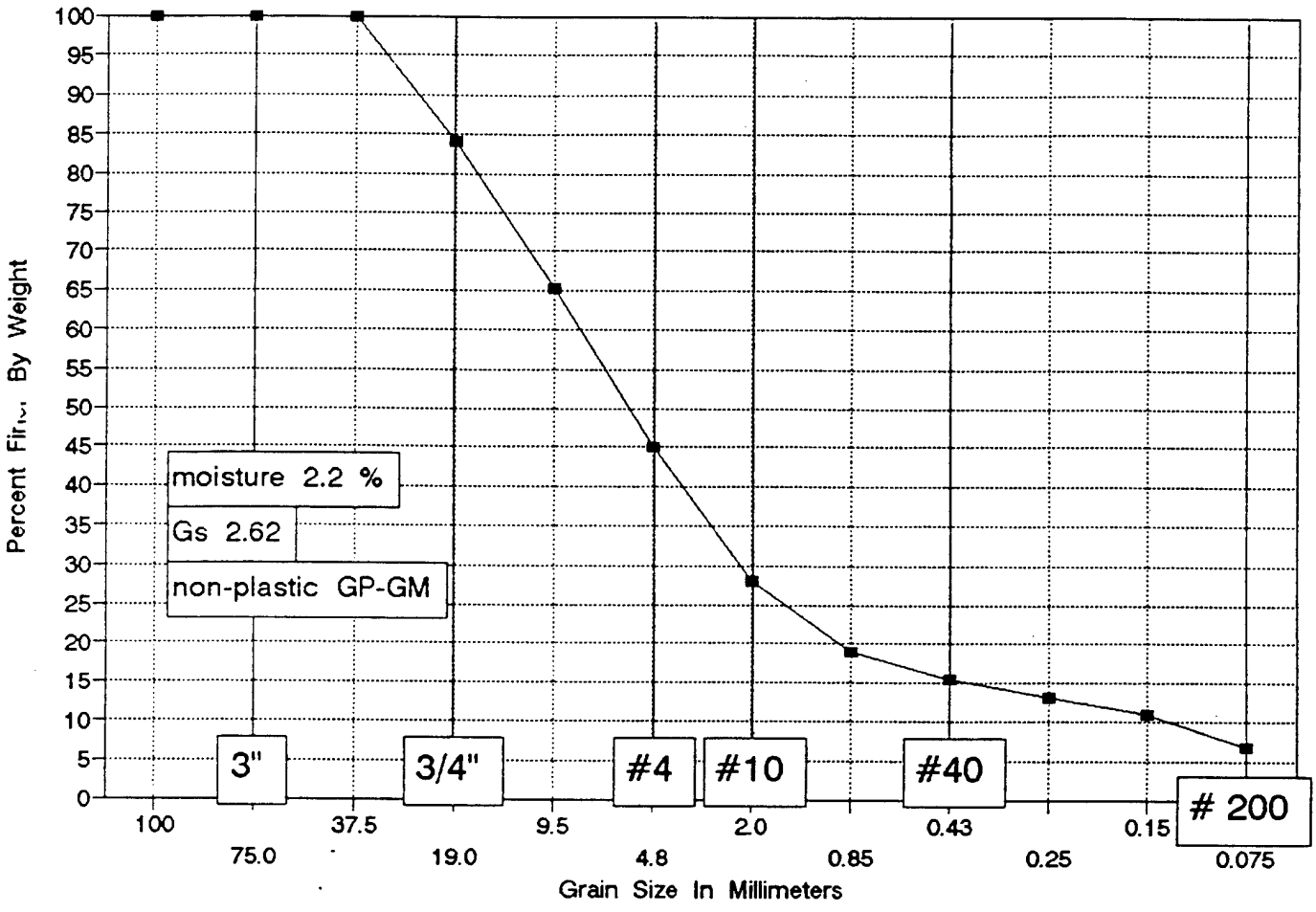
EGL

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SB-42-014, at 20.0-22.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-42-014
Sample at 20-22 feet

	totals
Wt soil and dish	215.6
Dry soil & dish	213.4
Dish	113.4
wet soil	776.9
dish	140.3
dry total	622.9

Moisture Content = 2.2 %

SIEVE ANALYSIS

Total sample dry = 622.9 g

Weight of sample split #4 37.1 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	99.1	84.09%	84.1	19.0
3/8 inch	216.97	65.17%	65.2	9.5
# 4	341.9	45.11%	45.1	4.8
# 10	14.08	27.99%	28.0	2.0
# 20	21.49	18.98%	19.0	0.85
# 40	24.51	15.31%	15.3	0.43
# 60	26.22	13.23%	13.2	0.25
# 100	28.14	10.89%	10.9	0.15
# 200	31.54	6.76%	6.8	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/26/94

BORING GB-42 SAMPLE 014 DEPTH 20-22' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	776.9
WT. OF ~~RINGS~~ Dish	140.3
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/25 #4	1/25 #4	
PAN	M-11	169	207	
WT. OF PAN & WET SOIL	215.6	586.3	148.9	
WT. OF PAN & DRY SOIL	213.4	585.1	148.2	
WT. OF MOISTURE				
WT. OF PAN	113.4	108.0	111.1	
WT. OF DRY SOIL				
MOISTURE CONTENT %	2.2			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		99.61			
☐			3/8"		216.97			
☑			#4		341.9			
☐			#10		14.08			
☐			#20		21.49			
☑			#40		24.51			
☐			#60		26.22			
☐			#100		28.14			
☐			#200		31.54			
☐								
☐								

(1)

NOTE: G_s 2.62

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Watson

LOCATION TEAD-N

BORING SB-42 SAMPLE 014 DEPTH 20-22'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

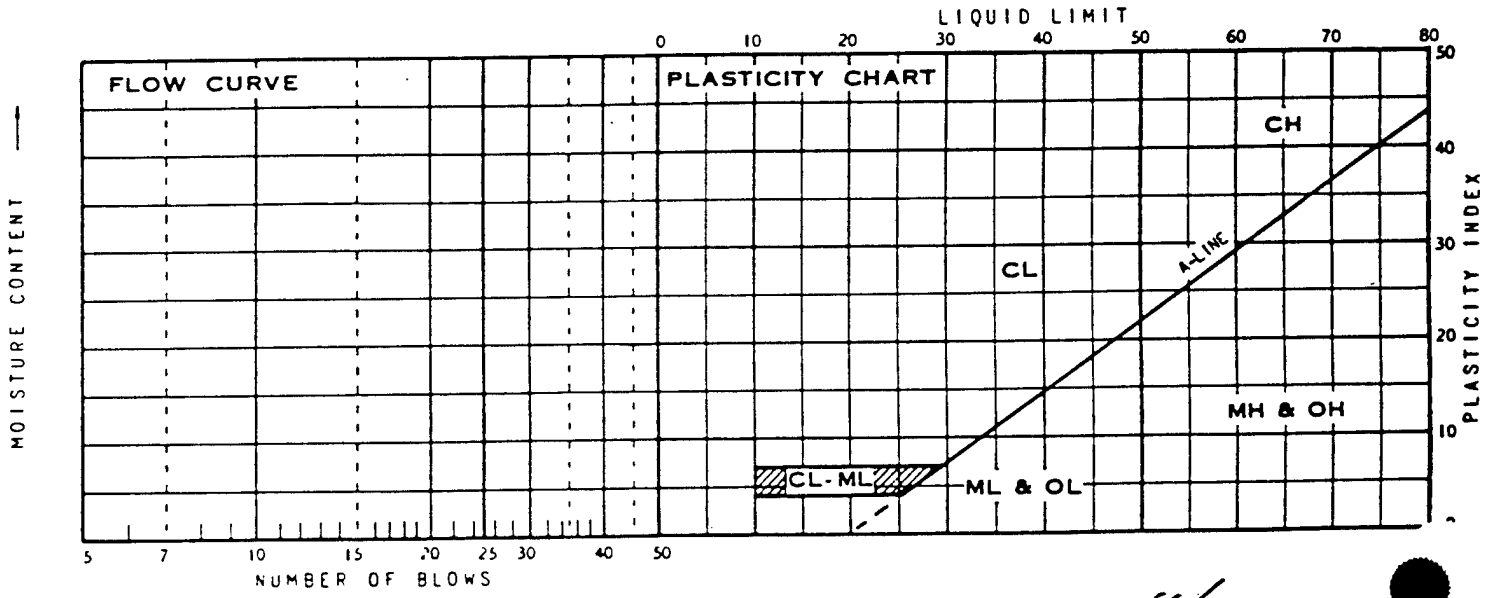
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY LAF 1/29/94

DETERMINATION	1	2	3	4	5	6
DISH		could not thread				
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



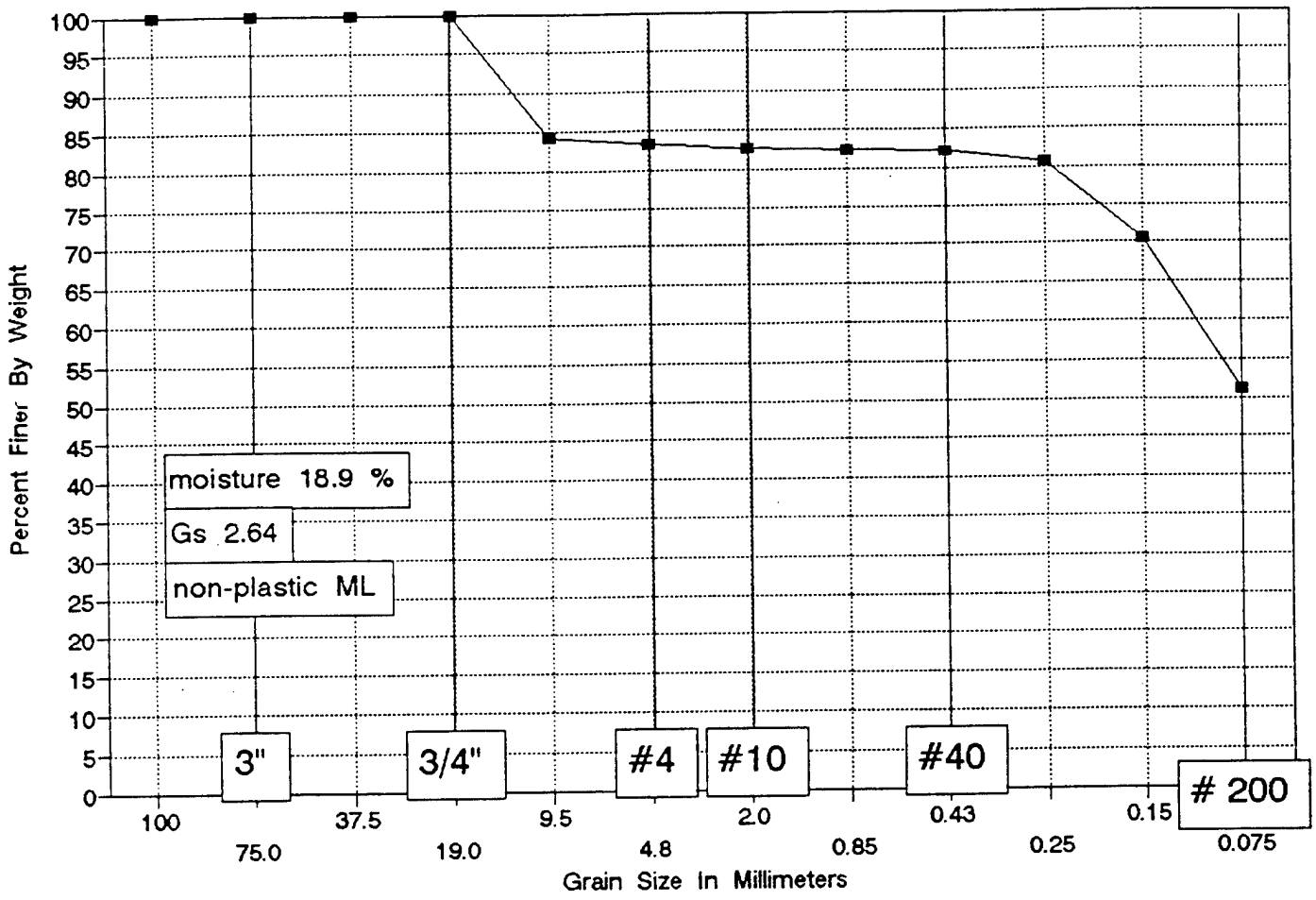
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SB-42-014, at 35.0-37.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-42-014
Sample at 35-37 feet

	totals
Wt soil and dish	195.8
Dry soil & dish	182.6
Dish	112.9
wet soil	404.2
dish	13.6
dry total	328.4

Moisture Content = 18.9 %

SIEVE ANALYSIS

Total sample dry = 328.4 g

Weight of sample split #4 72 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	51.62	84.28%	84.3	9.5
# 4	54.76	83.33%	83.3	4.8
# 10	0.5	82.75%	82.7	2.0
# 20	0.86	82.33%	82.3	0.85
# 40	1.03	82.13%	82.1	0.43
# 60	2.28	80.69%	80.7	0.25
# 100	11.01	70.58%	70.6	0.15
# 200	27.79	51.16%	51.2	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/26/94

BORING GB-42 SAMPLE 014 DEPTH 35-37' BY LaF

JAR ~~DENSITY~~	Total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	404.2
WT. OF ~~RINGS~~ DISH	13.6
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/25 ~~D~~ #4	1/26 ~~C~~ #4	
PAN	M-41	201	2	
WT. OF PAN & WET SOIL	195.8	173.0	179.4	
WT. OF PAN & DRY SOIL	182.6	172.1	176.8	
WT. OF MOISTURE				
WT. OF PAN	112.9	111.4	104.3	
WT. OF DRY SOIL				
MOISTURE CONTENT %	18.9	—	—	

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"		0			
☐			3/8"		51.62			
☑			#4		54.76			
☐			#10		0.50			
☐			#20		0.86			
☑			#40		1.03			
☐			#60		2.28			
☐			#100		11.01			
☐			#200		27.79			
☐								
☐								

(2)

NOTE: G_s 2.64

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER MONTGOMERY WATSON

LOCATION TEAD-N REF

BORING CB-42 SAMPLE 014 DEPTH 35-37'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

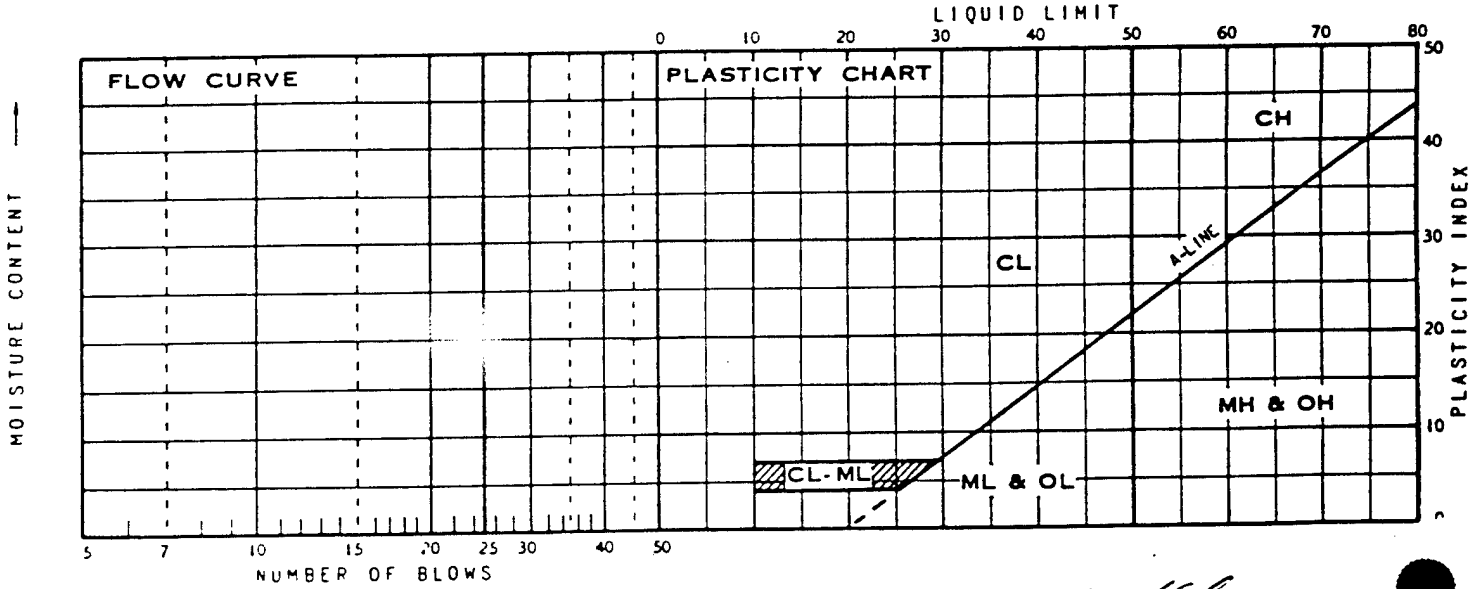
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY LAF 1/31/94

DETERMINATION	1	2	3	4	5	6
DISH	2	40				
WT OF DISH + WET SOIL	13.02	15.90	difficult to thread - candy material - crumbled easily			
WT OF DISH + DRY SOIL	11.04	13.5	—			
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	20.54	20.23	AV=20			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	AL104	131	108	could not get adequate blow count		
NUMBER OF BLOWS					(25)	
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



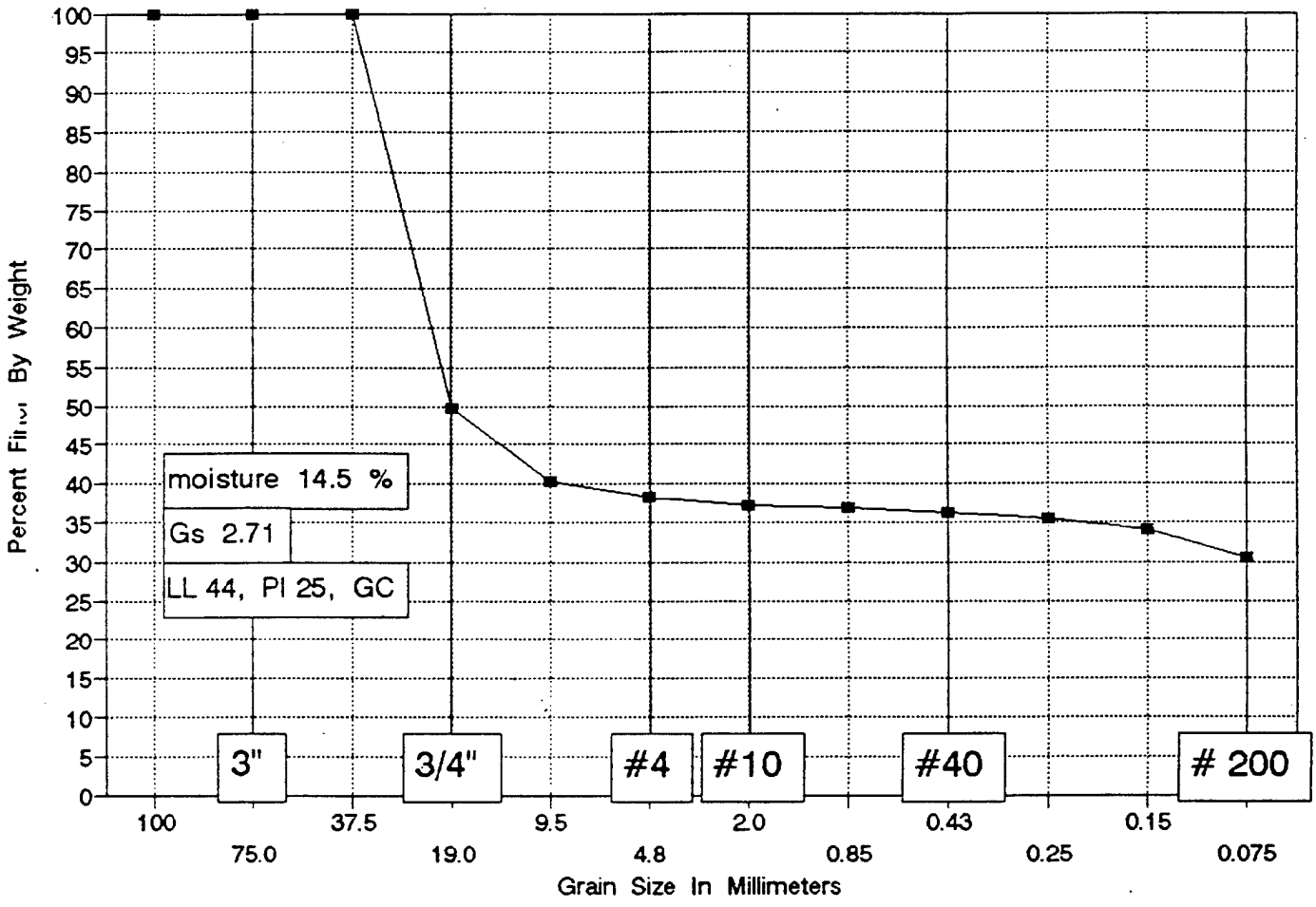
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SB-42-017, at 75.0-77.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-42-017
Sample at 75-77 feet

	totals
Wt soil and dish	96.5
Dry soil & dish	89.8
Dish	43.7
wet soil	392.8
dish	52
dry total	297.6

Moisture Content = 14.5 %

SIEVE ANALYSIS

Total sample dry = 297.6 g

Weight of sample split #4 25 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	149.63	49.71%	49.7	19.0
3/8 inch	177.95	40.20%	40.2	9.5
# 4	183.44	38.35%	38.4	4.8
# 10	0.72	37.25%	37.2	2.0
# 20	1.01	36.80%	36.8	0.85
# 40	1.34	36.30%	36.3	0.43
# 60	1.89	35.45%	35.5	0.25
# 100	2.79	34.07%	34.1	0.15
# 200	5.14	30.47%	30.5	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING GB-42 SAMPLE 017 DEPTH 75-77' BY LAF

JAR ~~DENSITY~~	Total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	392.8
WT. OF ~~RINGS~~ DISH	52.0
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/22 A #4	1/25 B #4	
PAN	L9	8	29	
WT. OF PAN & WET SOIL	96.5	319.9	134.8	
WT. OF PAN & DRY SOIL	89.8	314.4	133.4	
WT. OF MOISTURE				
WT. OF PAN	43.7	104.9	108.4	
WT. OF DRY SOIL				
MOISTURE CONTENT %	14.5	—	—	

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		149.63			
☐			3/8"		177.95			
☑			#4		183.44			
☐			#10		.72			
☐			#20		1.01			
☑			#40		1.34			
☐			#60		1.89			
☐			#100		2.79			
☐			#200		5.14			
☐								
☐								

AL only

(3)

NOTE: Gs 2.71

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Watson

LOCATION TEAD-N RFI

BORING SB-42 SAMPLE Q17 DEPTH 75-77'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

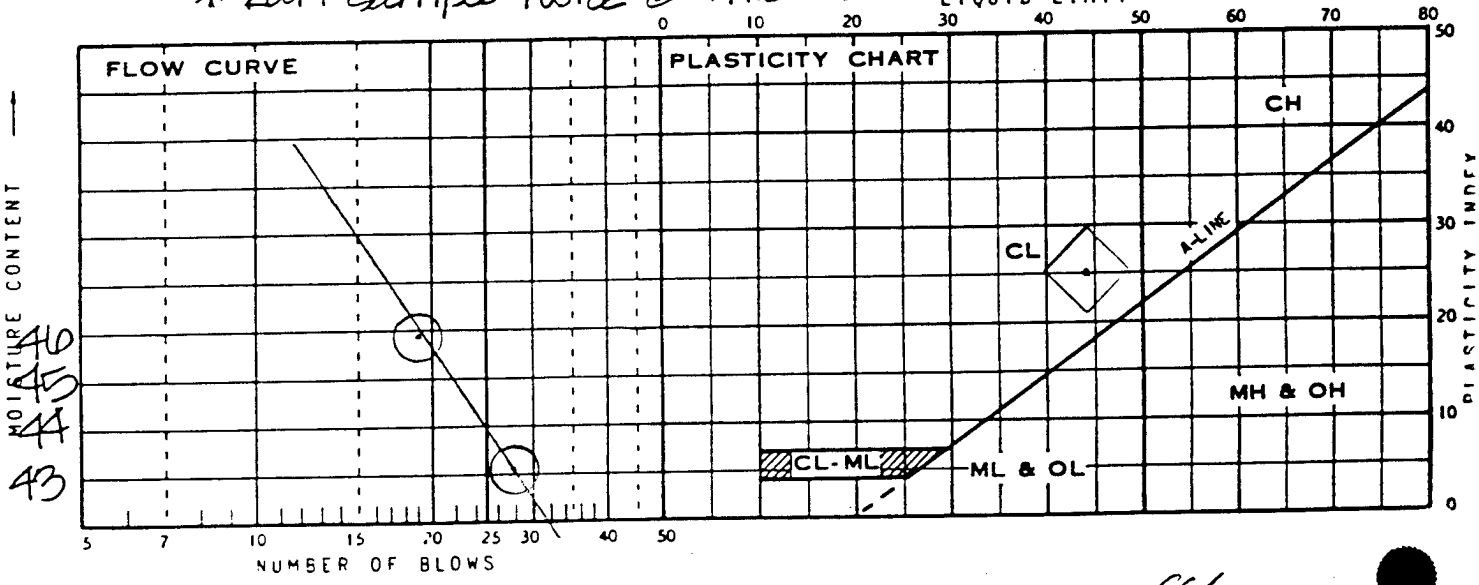
PLASTIC LIMIT BY VAF 2294

DETERMINATION	1	2	3	4	5	6
DISH	AL75	28				
WT OF DISH + WET SOIL	7.96	7.31				
WT OF DISH + DRY SOIL	6.93	6.38	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	18.63	18.67	AV = 19			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	AL56	AL179	45	Insufficient amount of sample to get 3 points		
NUMBER OF BLOWS	28 *	19				
WT OF DISH + WET SOIL	9.11	10.29				
WT OF DISH + DRY SOIL	6.79	7.49	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	43.04	45.98				

* Ran sample twice @ m.c - both 28 blows



SUMMARY

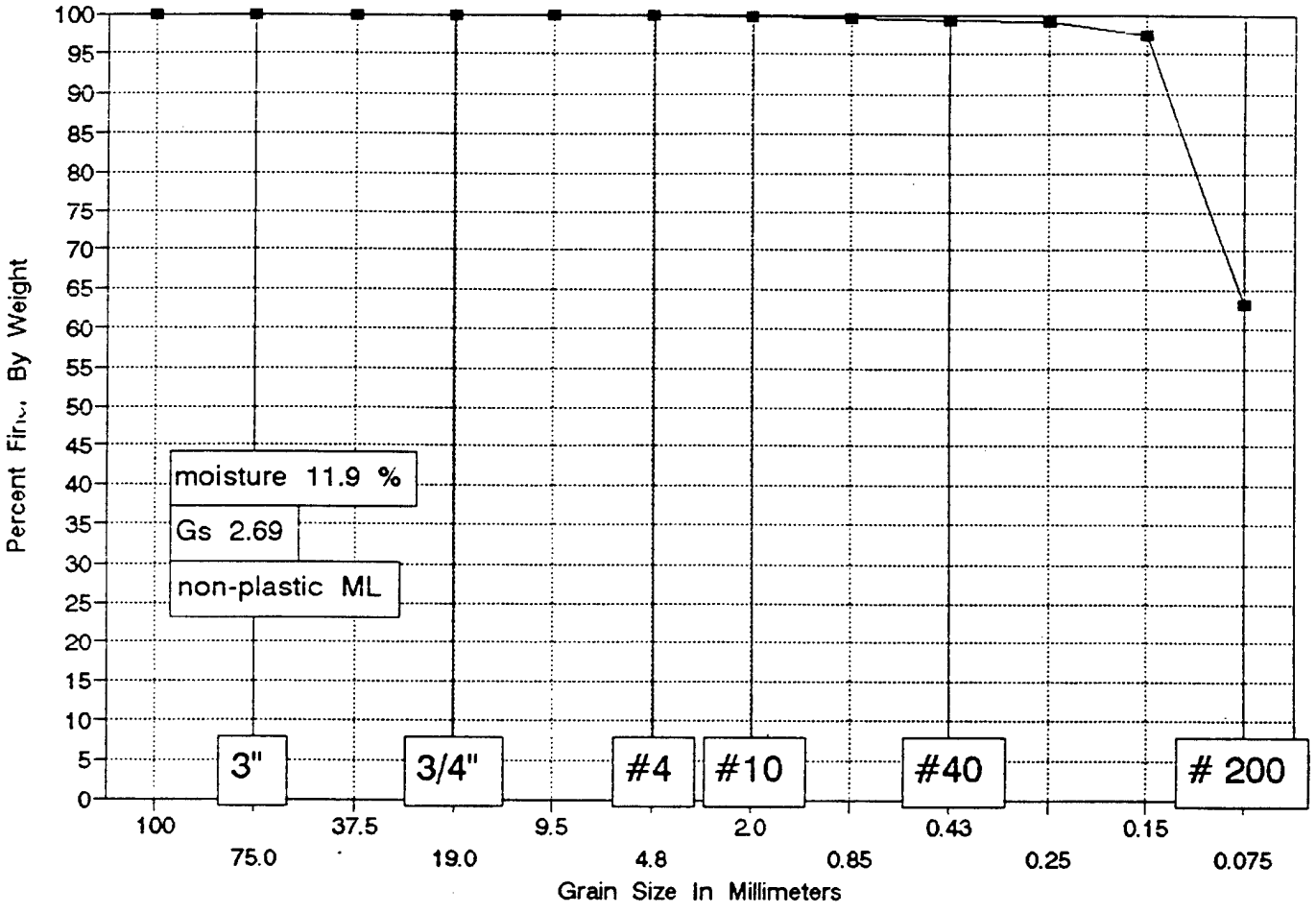
EGH

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		44	19	25	CL	

DAMES & MOORE

GRADATION CURVE

Location SB-42-015, at 76.5-77.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-42-015
Sample at 76.5-77 feet

	totals
Wt soil and dish	63.2
Dry soil & dish	61.1
Dish	43.5
wet soil	98.3
dish	10.8
dry total	78.2

Moisture Content = 11.9 %

SIEVE ANALYSIS

Total sample dry = 78.2 g

Weight of sample split #4 20.1 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	0	100.00%	100.0	9.5
# 4	0	100.00%	100.0	4.8
# 10	0.06	99.70%	99.7	2.0
# 20	0.09	99.55%	99.6	0.85
# 40	0.12	99.40%	99.4	0.43
# 60	0.16	99.20%	99.2	0.25
# 100	0.49	97.56%	97.6	0.15
# 200	7.39	63.23%	63.2	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/26/94

BORING GB-42 SAMPLE 015 DEPTH 765-77' BY LAF

* very small sample 1/28

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	98.3
WT. OF ~~RINGS~~ DCb	10.8
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	~~#4~~	~~#4~~	
PAN	A-4	316	316	
WT. OF PAN & WET SOIL	63.2		131.7	
WT. OF PAN & DRY SOIL	61.1		131.1	
WT. OF MOISTURE				
WT. OF PAN	43.5	111.0	111.0	
WT. OF DRY SOIL				
MOISTURE CONTENT %	11.9			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"					
☐			3/8"					
☑			#4		0			
☐			#10		0.06			
☐			#20		0.09			
☑			#40		0.12			
☐			#60		0.16			
☐			#100		0.49			
☐			#200		7.39			
☐								
☐								

(4)

NOTE: G_s 2.69

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Watson

LOCATION TEAD-N

BORING SB-42 SAMPLE 015 DEPTH 765-77

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

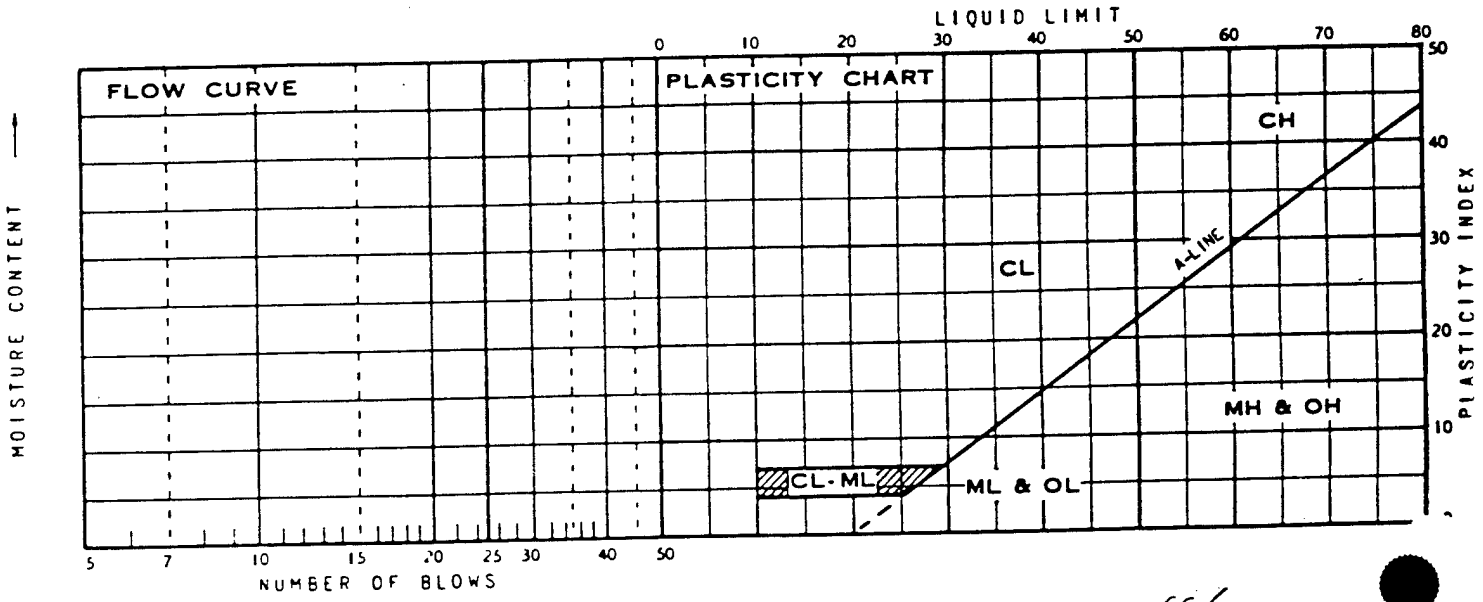
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY LAF 12/9/94

DETERMINATION	1	2	3	4	5	6
DISH		COULD NOT THREAD				
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



SUMMARY

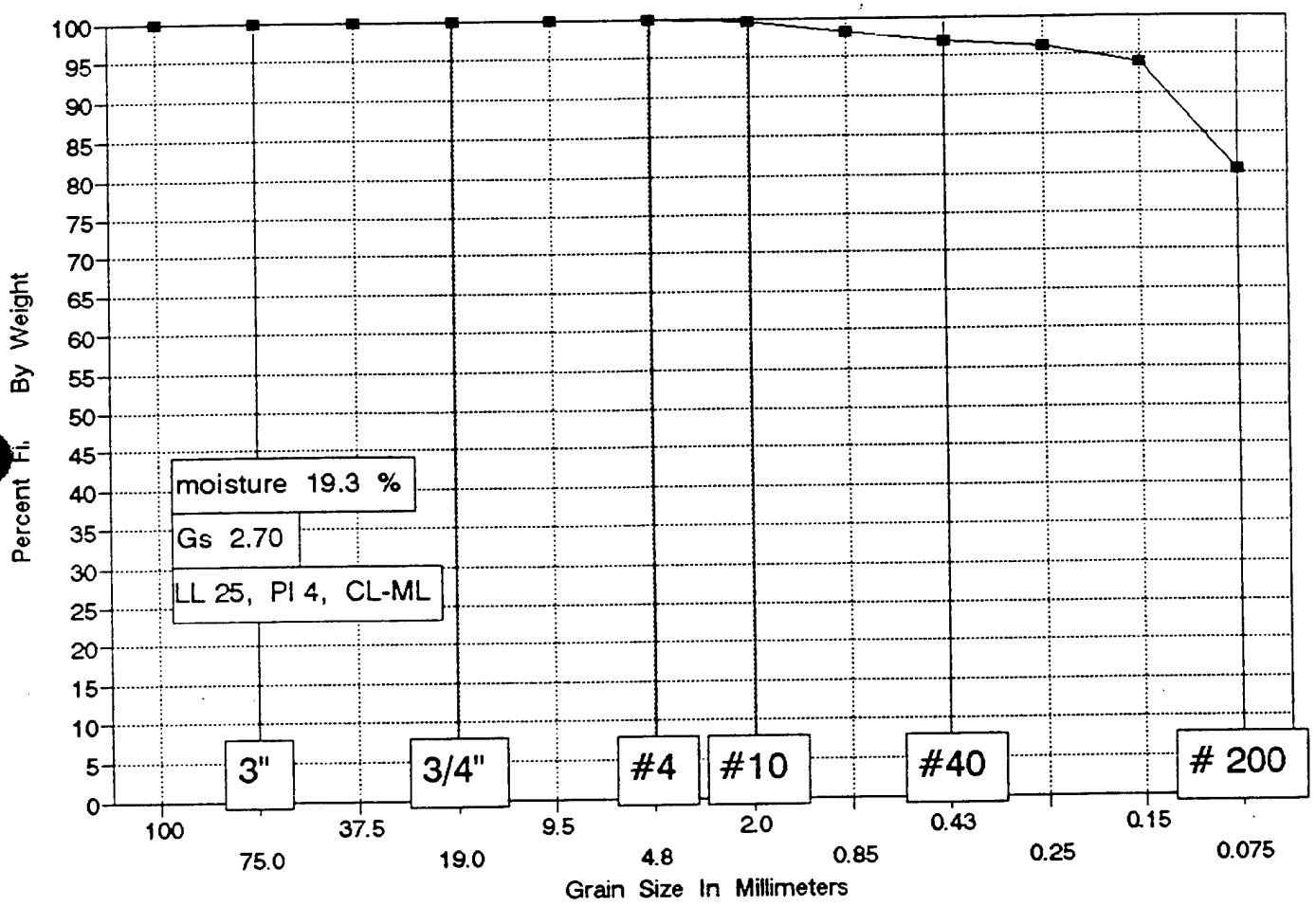
EGL

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SB-42-016, at 70.0-72.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-42-016
Sample at 70-72 feet

	totals
Wt soil and dish	121.2
Dry soil & dish	108.6
Dish	43.3
wet soil	469.8
dish	13.5
dry total	382.5

Moisture Content = 19.3 %

SIEVE ANALYSIS

Total sample dry = 382.5 g

Weight of sample split #4 96.3 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	0	100.00%	100.0	9.5
# 4	0	100.00%	100.0	4.8
# 10	0.52	99.46%	99.5	2.0
# 20	1.75	98.18%	98.2	0.85
# 40	2.89	97.00%	97.0	0.43
# 60	3.76	96.10%	96.1	0.25
# 100	5.79	93.99%	94.0	0.15
# 200	19.03	80.24%	80.2	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/26/94

BORING GB-42 SAMPLE 016 DEPTH 70-72' BY LAF

JAR ~~DENSITY~~	Total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	469.8
WT. OF ~~RINGS~~ DCh	135
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/28 ⊕ #4	1/28 ⊖ #4	
PAN	1-7	GT-24	GT-24	
WT. OF PAN & WET SOIL	121.2		209.7	
WT. OF PAN & DRY SOIL	108.6		205.7	
WT. OF MOISTURE				
WT. OF PAN	43.3	109.4	109.4	
WT. OF DRY SOIL				
MOISTURE CONTENT %	19.3			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"					
☐			3/8"					
☑			#4		0			
☐			#10		0.52			
☐			#20		1.75			
☑			#40		2.89			
☐			#60		3.76			
☐			#100		5.79			
☐			#200		19.03			
☐								
☐								

(5)

NOTE: G_s 2.70

EAL

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Water

LOCATION TEAD-N REF

BORING CB-42 SAMPLE 016 DEPTH 70-72'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

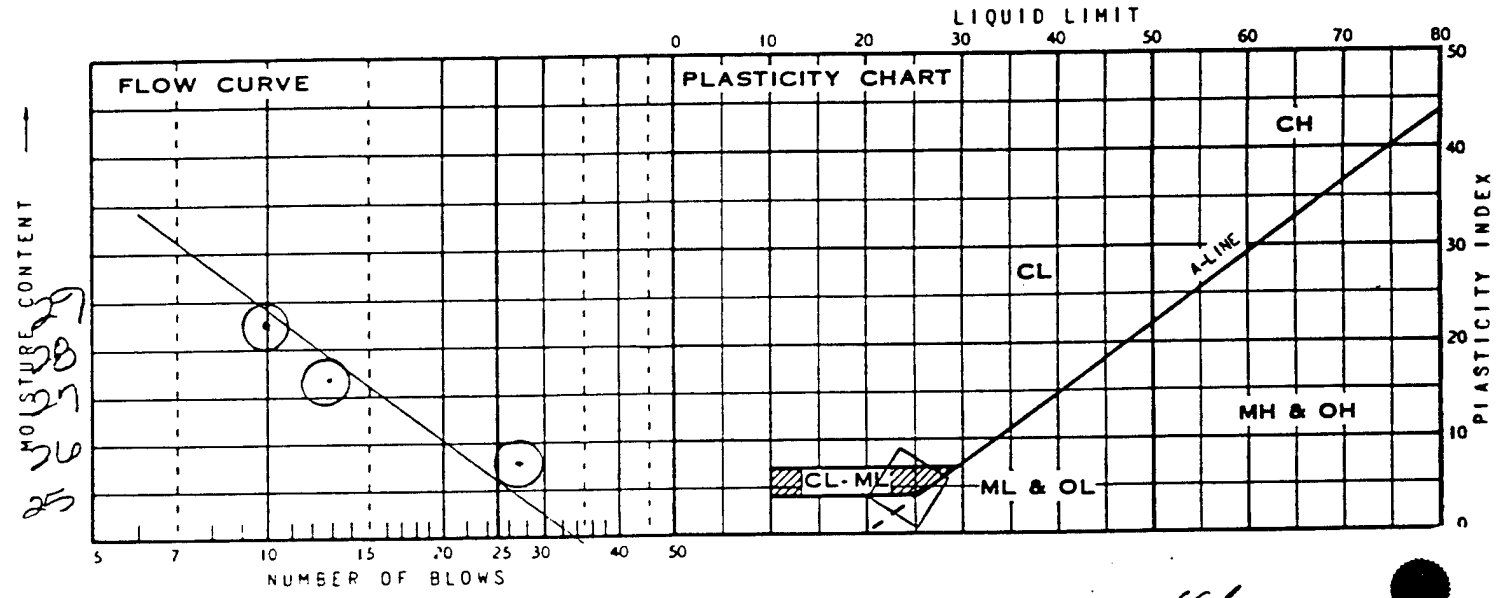
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY LAE 1/31/94

DETERMINATION	1	2	3	4	5	6
DISH	77	34				
WT OF DISH + WET SOIL	14.09	12.23				
WT OF DISH + DRY SOIL	11.83	10.34	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	21.57	21.14	AV=21			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	AL106	54	A-9			
NUMBER OF BLOWS	28	13	10			
WT OF DISH + WET SOIL	11.88	12.60	11.46			
WT OF DISH + DRY SOIL	9.75	10.19	9.22	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	25.51	27.42	28.64			



SUMMARY

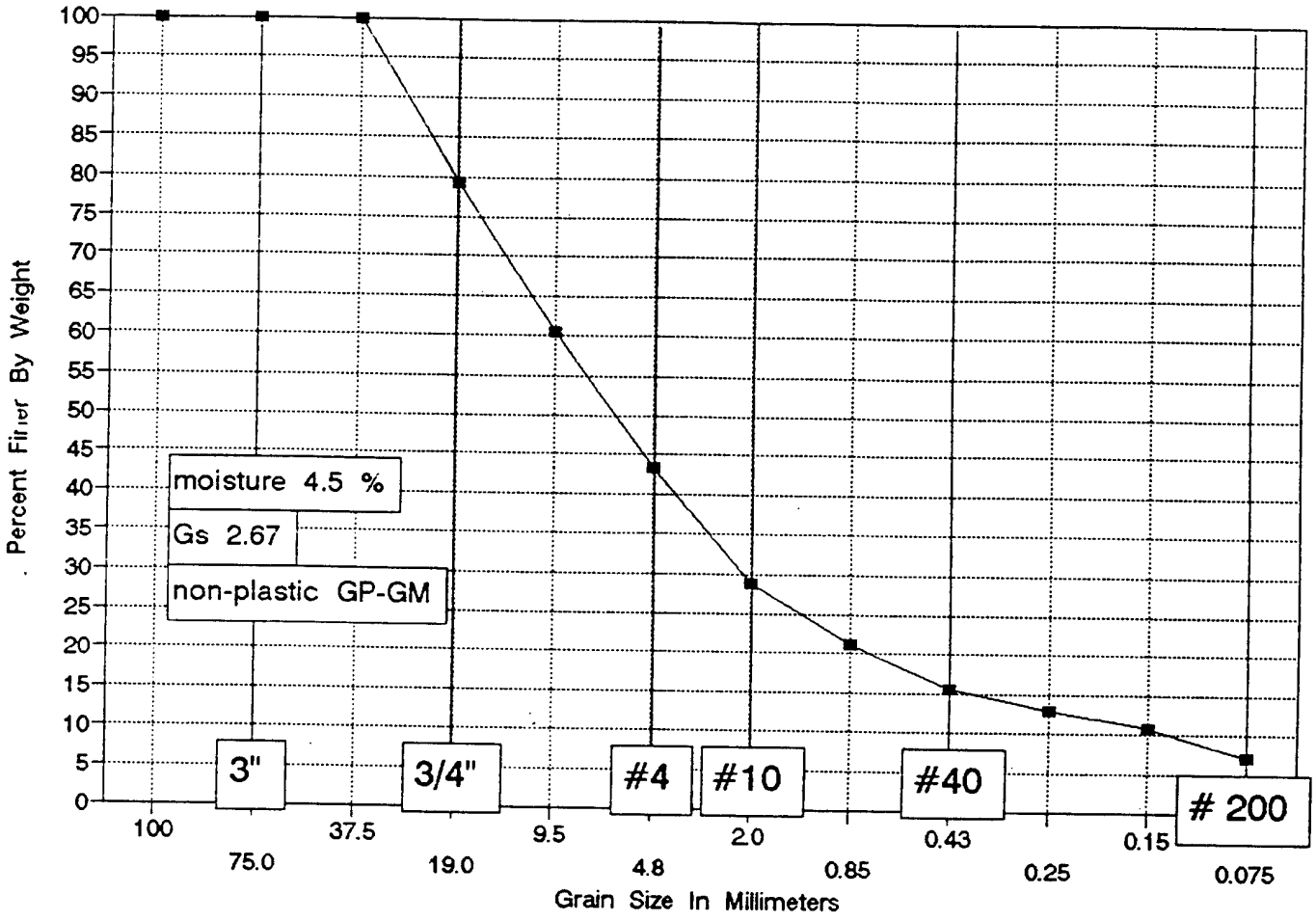
EGL

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		25	21	4	CL-ML	

DAMES & MOORE

GRADATION CURVE

Location SB-42-017, at 5.0-7.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-42-017
Sample at 5-7 feet

	totals
Wt soil and dish	176.4
Dry soil & dish	170.7
Dish	43.7
wet soil	507.3
dish	13.4
dry total	472.7

Moisture Content = 4.5 %

SIEVE ANALYSIS

Total sample dry = 472.7 g

Weight of sample split #4 45.8 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	98.28	79.21%	79.2	19.0
3/8 inch	186.92	60.46%	60.5	9.5
# 4	267.97	43.31%	43.3	4.8
# 10	15.38	28.77%	28.8	2.0
# 20	23.39	21.19%	21.2	0.85
# 40	29.38	15.53%	15.5	0.43
# 60	32.08	12.97%	13.0	0.25
# 100	34.49	10.69%	10.7	0.15
# 200	38.33	7.06%	7.1	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/26/97

BORING GB-42 SAMPLE 017 DEPTH 5-7' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	507.3
WT. OF ~~RINGS~~ DISH	13.4
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/28 ~~A~~ #4	1/28 ~~B~~ #4	
PAN	L-6	311	32	
WT. OF PAN & WET SOIL	176.4	391.8	155.0	
WT. OF PAN & DRY SOIL	170.7	390.5	153.8	
WT. OF MOISTURE				
WT. OF PAN	43.7	109.3	108.0	
WT. OF DRY SOIL				
MOISTURE CONTENT %	4.5			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT		
						PARTIAL		TOTAL
						RETAINED	FINER	FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		99.28			
☐			3/8"		186.92			
☑			#4		267.97			
☐			#10		15.38			
☐			#20		23.39			
☑			#40		29.38			
☐			#60		32.08			
☐			#100		34.49			
☐			#200		38.33			
☐								
☐								

(6)

NOTE: G_s 2.67

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Water

LOCATION TEAD-N

BORING GB-42 SAMPLE 017 DEPTH 5-7'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

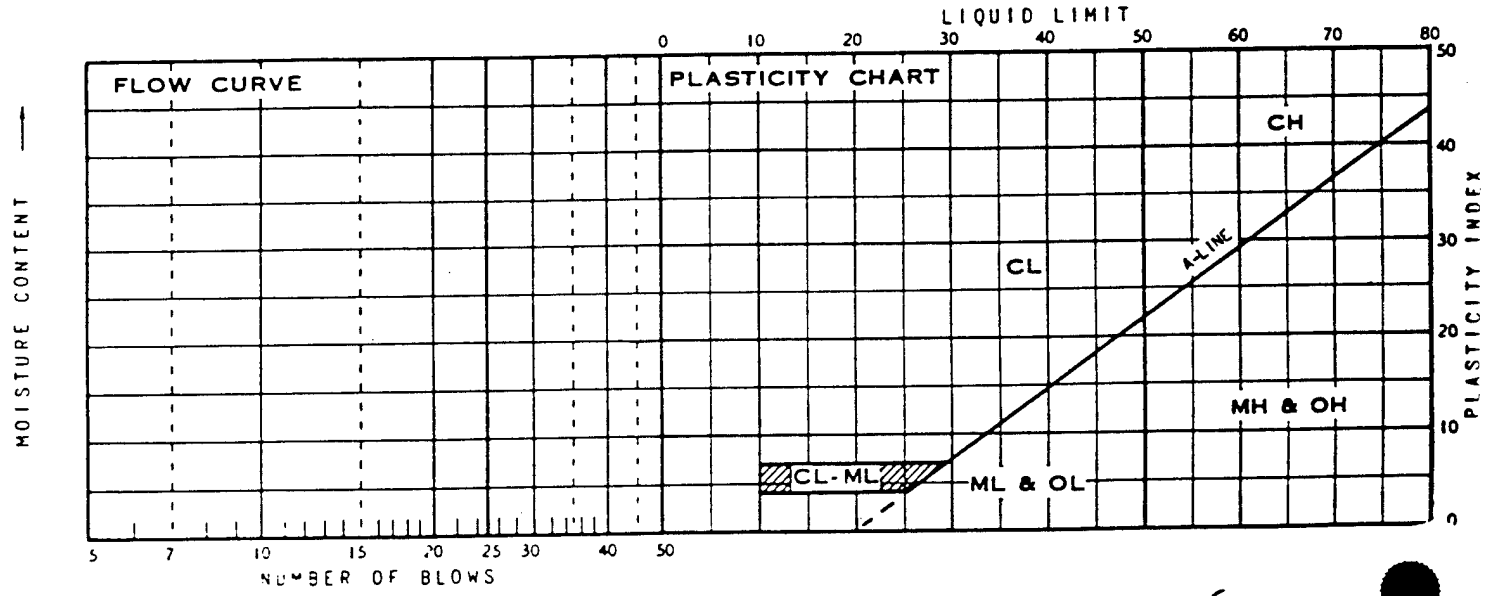
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY LAF 12/9/94

DETERMINATION	1	2	3	4	5	6
DISH		could not thread				
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



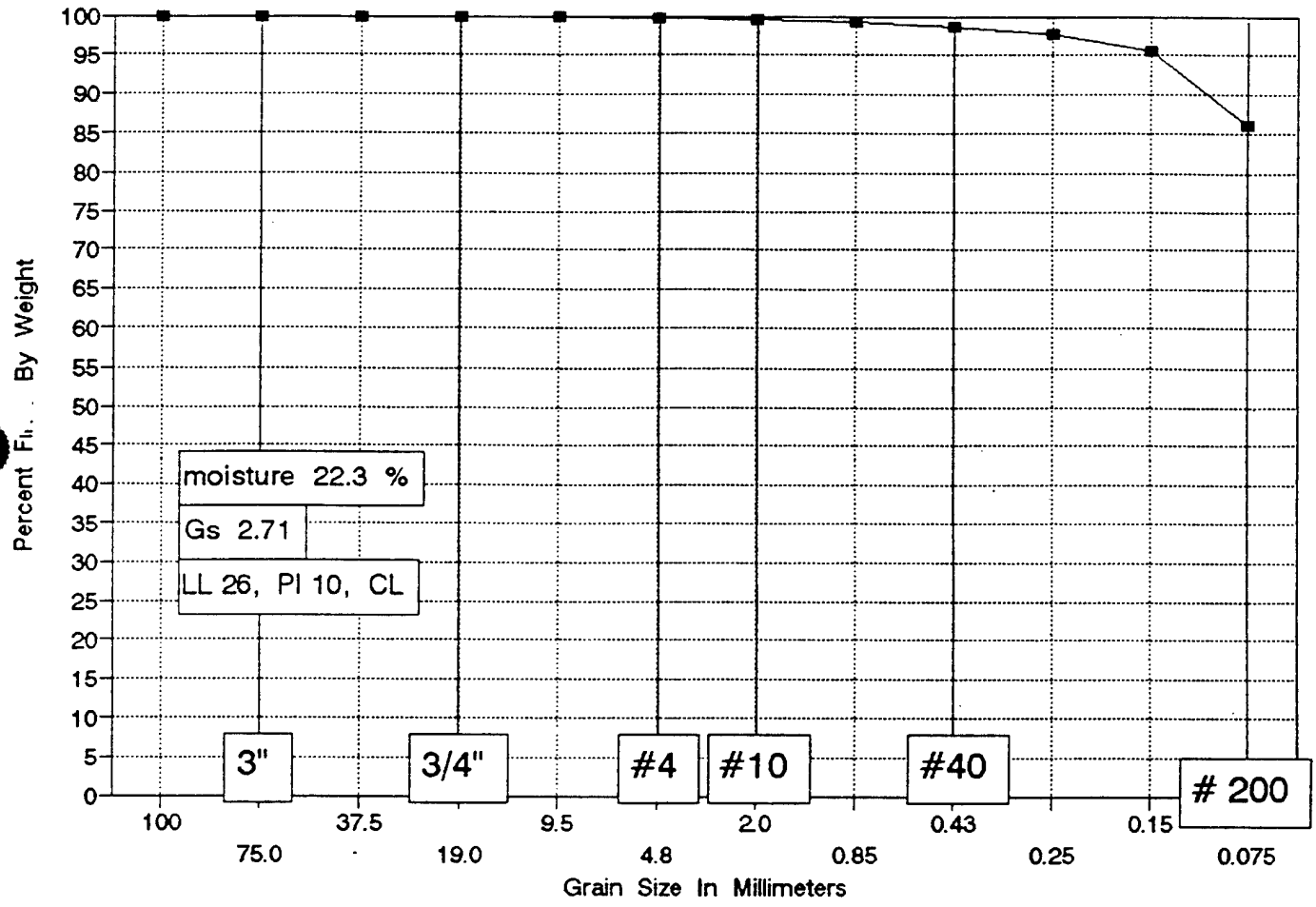
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SB-42-017, at 60.0-62.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-42-017
Sample at 60-62 feet

Moisture Content = 22.3 %

	totals
Wt soil and dish	126.7
Dry soil & dish	111.6
Dish	43.8
wet soil	393.9
dish	10
dry total	314.0

SIEVE ANALYSIS

Total sample dry = 314.0 g

Weight of sample split #4 78.2 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	0	100.00%	100.0	9.5
# 4	1.16	99.63%	99.6	4.8
# 10	0.04	99.58%	99.6	2.0
# 20	0.21	99.36%	99.4	0.85
# 40	0.75	98.68%	98.7	0.43
# 60	1.55	97.66%	97.7	0.25
# 100	3.15	95.62%	95.6	0.15
# 200	10.64	86.07%	86.1	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/26/94

BORING GB-42 SAMPLE 017 DEPTH 60-62' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	393.9
WT. OF ~~RINGS~~ DISh	10.0
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/25 ⊕#4	1/25 ⊖#4	
PAN	E-4	208	98	
WT. OF PAN & WET SOIL	120.7	117.1	193.1	
WT. OF PAN & DRY SOIL	111.6	116.4	186.3	
WT. OF MOISTURE				
WT. OF PAN	43.8	112.2	108.1	
WT. OF DRY SOIL				
MOISTURE CONTENT %	22.3			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"					
☐			3/8"		0			
☑			#4		1.16			
☐			#10		0.04			
☐			#20		0.21			
☑			#40		0.75			
☐			#60		1.55			
☐			#100		3.15			
☐			#200		10.64			
☐								
☐								

(7)

NOTE: Gs 2.71

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER MONTEREY/WATSON

LOCATION TEAD - N REF

BORING SB-42 SAMPLE 017 DEPTH 60-62'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

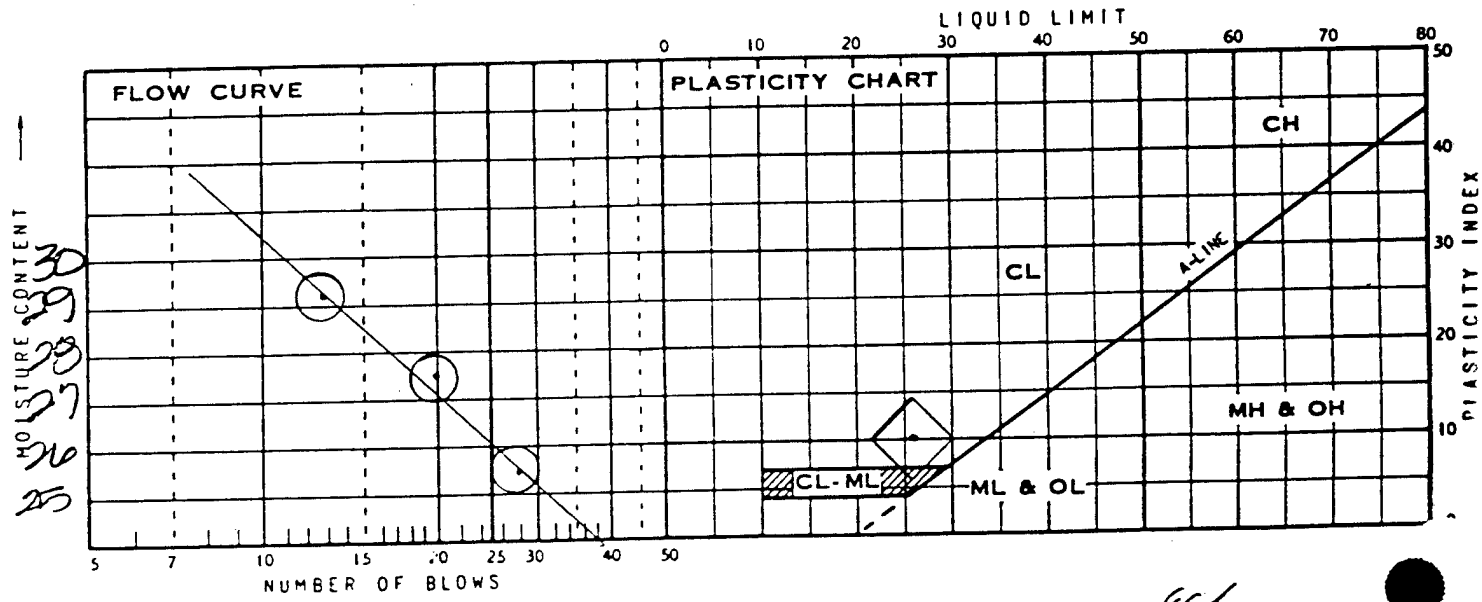
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RH 1/31/94

DETERMINATION	1	2	3	4	5	6
DISH	000	47				
WT OF DISH + WET SOIL	14.52	14.98				
WT OF DISH + DRY SOIL	12.70	13.13	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	16.11	15.77	AV=16			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	AL-180	AL-119	35			
NUMBER OF BLOWS	28	20	13			
WT OF DISH + WET SOIL	12.43	14.35	13.36			
WT OF DISH + DRY SOIL	10.19	11.56	10.66	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	25.48	27.46	29.11			



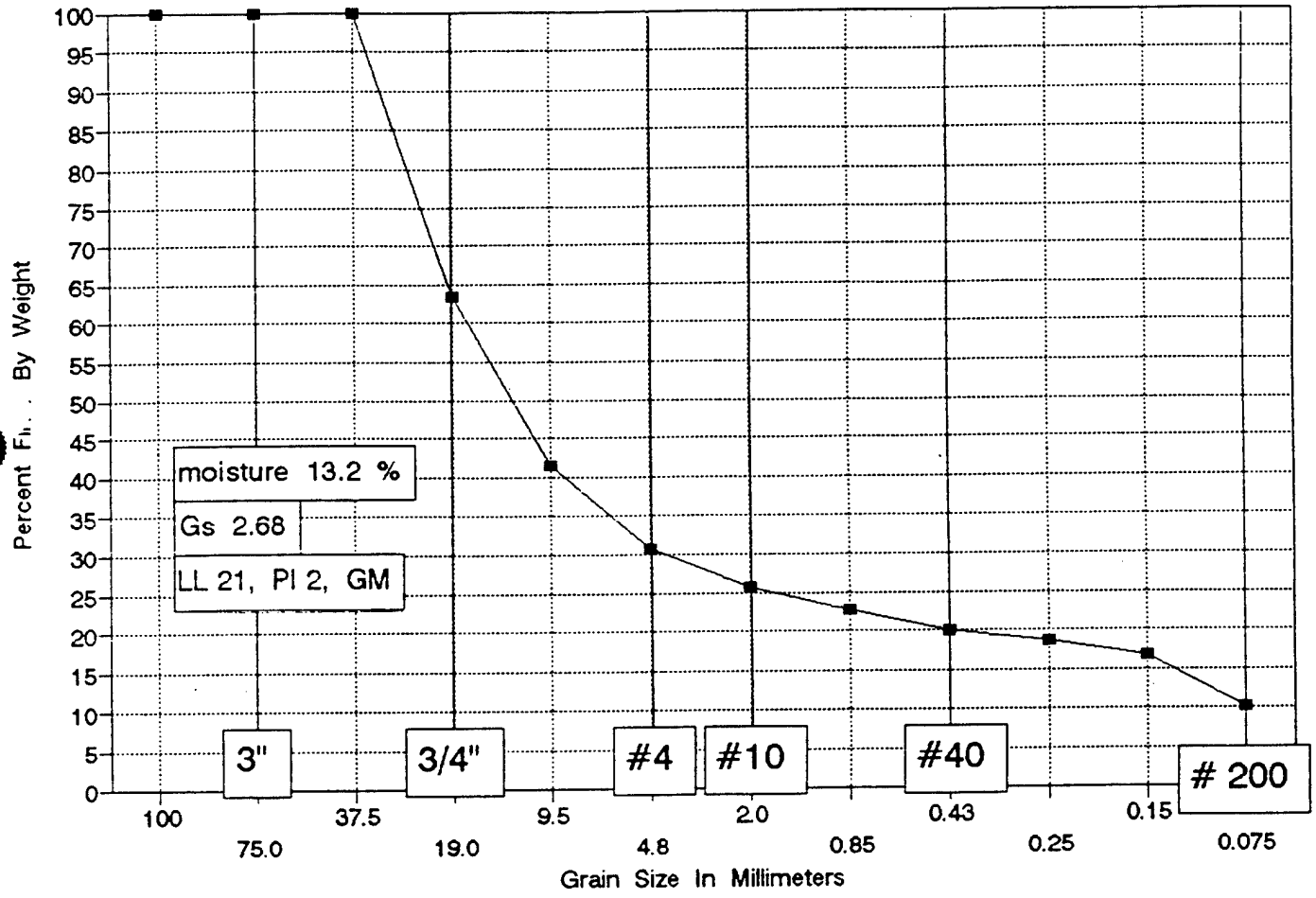
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		26	16	10	CL	

DAMES & MOORE

GRADATION CURVE

Location SB-42-018, at 1.5-3.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-42-018
Sample at 1.5-3 feet

	totals
Wt soil and dish	113.7
Dry soil & dish	105.5
Dish	43.4
wet soil	581.9
dish	13.7
dry total	501.9

Moisture Content = 13.2 %

SIEVE ANALYSIS

Total sample dry = 501.9 g

Weight of sample split #4 70.5 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	183.78	63.38%	63.4	19.0
3/8 inch	293.3	41.56%	41.6	9.5
# 4	347.7	30.73%	30.7	4.8
# 10	11.81	25.58%	25.6	2.0
# 20	18.36	22.72%	22.7	0.85
# 40	24.29	20.14%	20.1	0.43
# 60	27.36	18.80%	18.8	0.25
# 100	31.95	16.80%	16.8	0.15
# 200	47.16	10.17%	10.2	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/18/94

BORING GB-42 SAMPLE 010 DEPTH 1.5-3' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	5819
WT. OF ~~RINGS~~ DRY	137
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/21 ~~D~~ #4	1/22 ~~D~~ #4	
PAN	E-2	91	62	
WT. OF PAN & WET SOIL	113.7	468.2	180.9	
WT. OF PAN & DRY SOIL	105.5	467.4	180.2	
WT. OF MOISTURE				
WT. OF PAN	43.4	106.2	109.7	
WT. OF DRY SOIL				
MOISTURE CONTENT %	13.2			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		183.78			
☐			3/8"		293.3			
☑			#4		347.7			
☐			#10		11.81			
☐			#20		18.36			
☑			#40		24.29			
☐			#60		27.36			
☐			#100		31.95			
☐			#200		47.16			
☐								
☐								

SIL only

(8)

NOTE: Gs 2.68

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER MONTGOMERY WATSON

LOCATION TEAD-N REI

BORING SB-42 SAMPLE 018 DEPTH 15-31

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

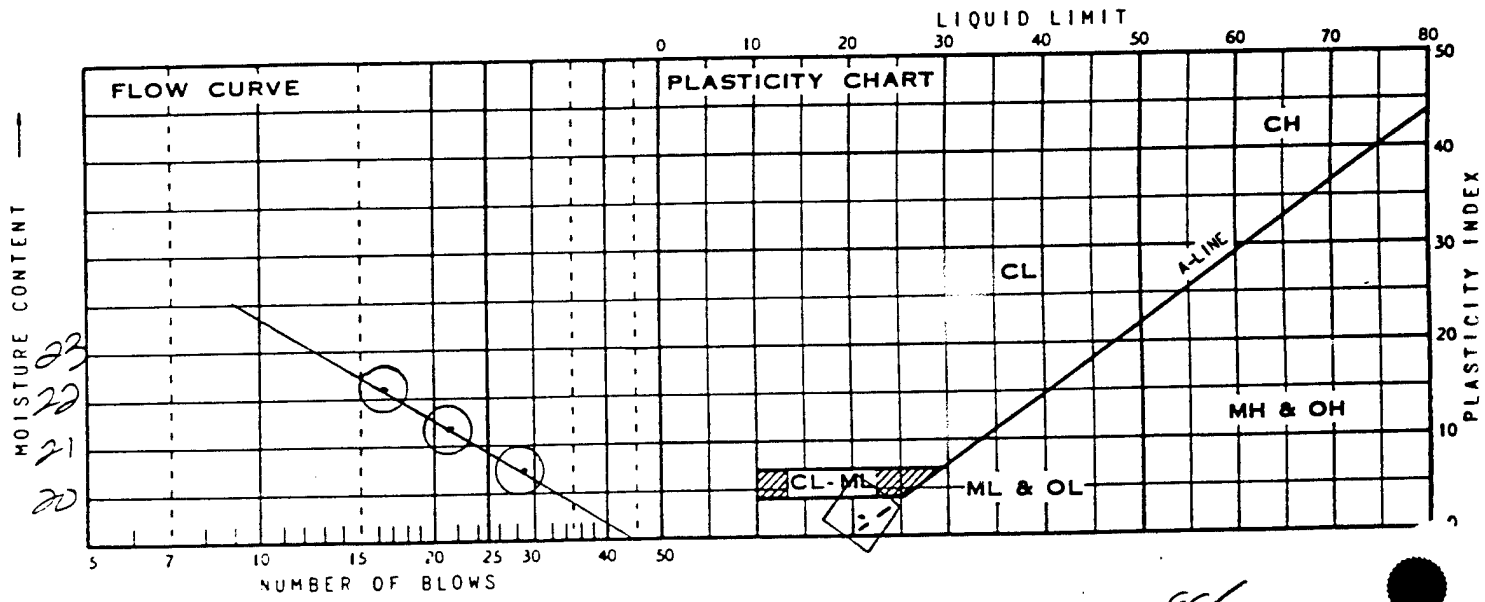
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RH 1/25/94

DETERMINATION	1	2	3	4	5	6
DISH	33	5				
WT OF DISH + WET SOIL	12.26	11.37				
WT OF DISH + DRY SOIL	10.55	9.81	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	18.69	18.55	AV=19			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	AL=132	11	133			
NUMBER OF BLOWS	29	22	17			
WT OF DISH + WET SOIL	11.18	12.31	11.56			
WT OF DISH + DRY SOIL	9.52	10.39	9.71	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	20.44	21.36	22.26			



SUMMARY

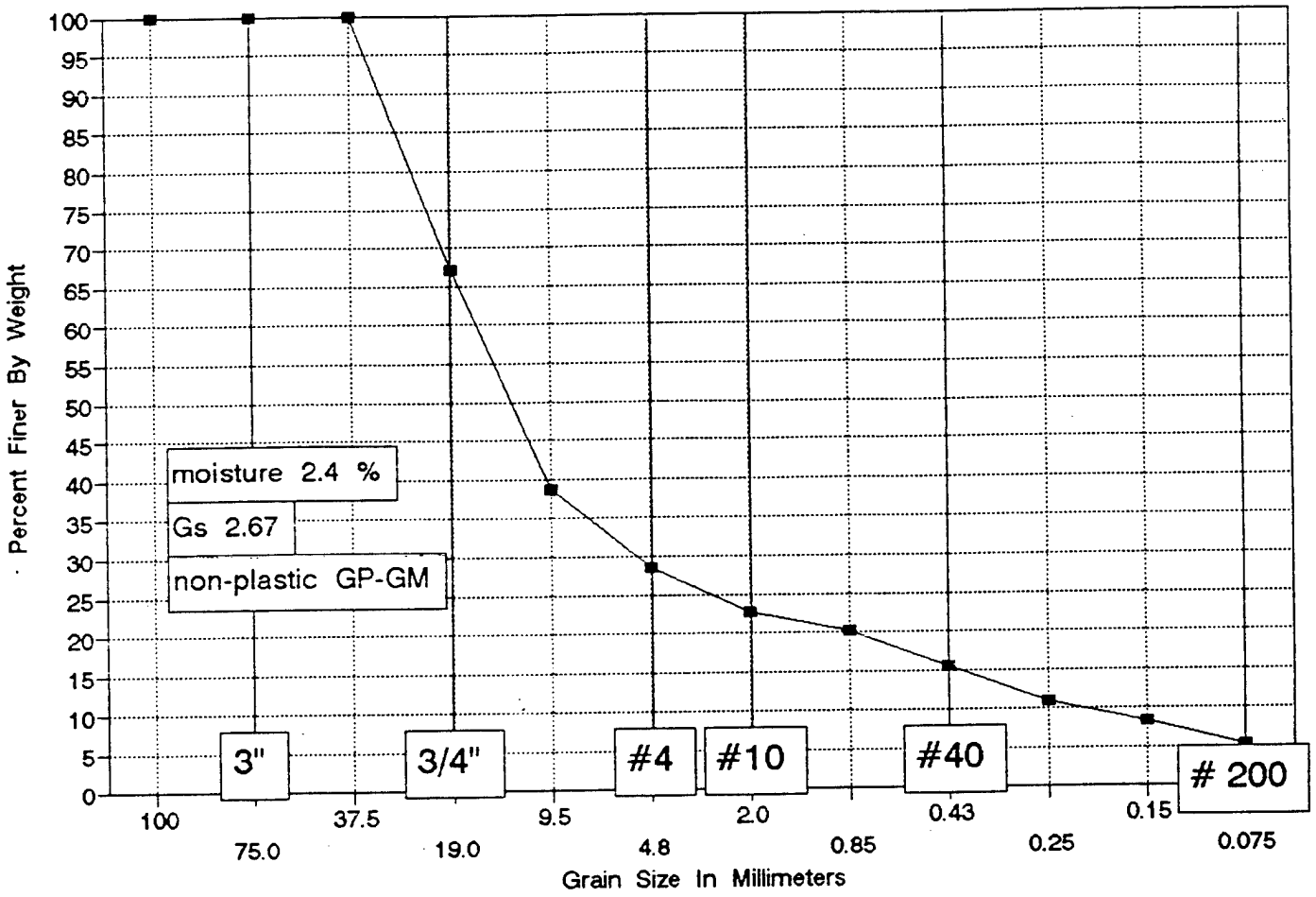
DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		21	19	2	CL-ML	

ML

DAMES & MOORE

GRADATION CURVE

Location SB-42-021B, at 2.0-4.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-42-021B
Sample at 2-4 feet

Moisture Content = 2.4 %

	totals
Wt soil and dish	108.6
Dry soil & dish	107.1
Dish	43.4
wet soil	407.4
dish	10.7
dry total	387.6

SIEVE ANALYSIS

Total sample dry = 387.6 g

Weight of sample split #4 38.6 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	127.45	67.12%	67.1	19.0
3/8 inch	237.73	38.66%	38.7	9.5
# 4	277.12	28.50%	28.5	4.8
# 10	7.85	22.70%	22.7	2.0
# 20	11.26	20.19%	20.2	0.85
# 40	17.47	15.60%	15.6	0.43
# 60	23.75	10.96%	11.0	0.25
# 100	27.26	8.37%	8.4	0.15
# 200	31.54	5.21%	5.2	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/16/94

BORING GB-42 SAMPLE 021B DEPTH 2.0-4.0' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	407.4
WT. OF ~~RINGS~~ DISH	10.7
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/21 ~~#4~~	1/22 ~~#4~~	
PAN	E-20	121	124	
WT. OF PAN & WET SOIL	108.6	389.9	150.6	
WT. OF PAN & DRY SOIL	107.1	388.5	150.3	
WT. OF MOISTURE				
WT. OF PAN	43.4	106.9	111.7	
WT. OF DRY SOIL				
MOISTURE CONTENT %	2.4	—	—	

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		127.45			
☐			3/8"		237.73			
☑			#4		277.12			
☐			#10		7.85			
☐			#20		11.26			
☑ AL only			#40		17.47			
☐			#60		23.75			
☐			#100		27.26			
☐			#200		31.54			
☐								
☐								

(9)

NOTE: G_s 2.67

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER MONTGOMERY WATSON

LOCATION LEAD-N REI

BORING SB-42 SAMPLE 0213 DEPTH 2-4'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

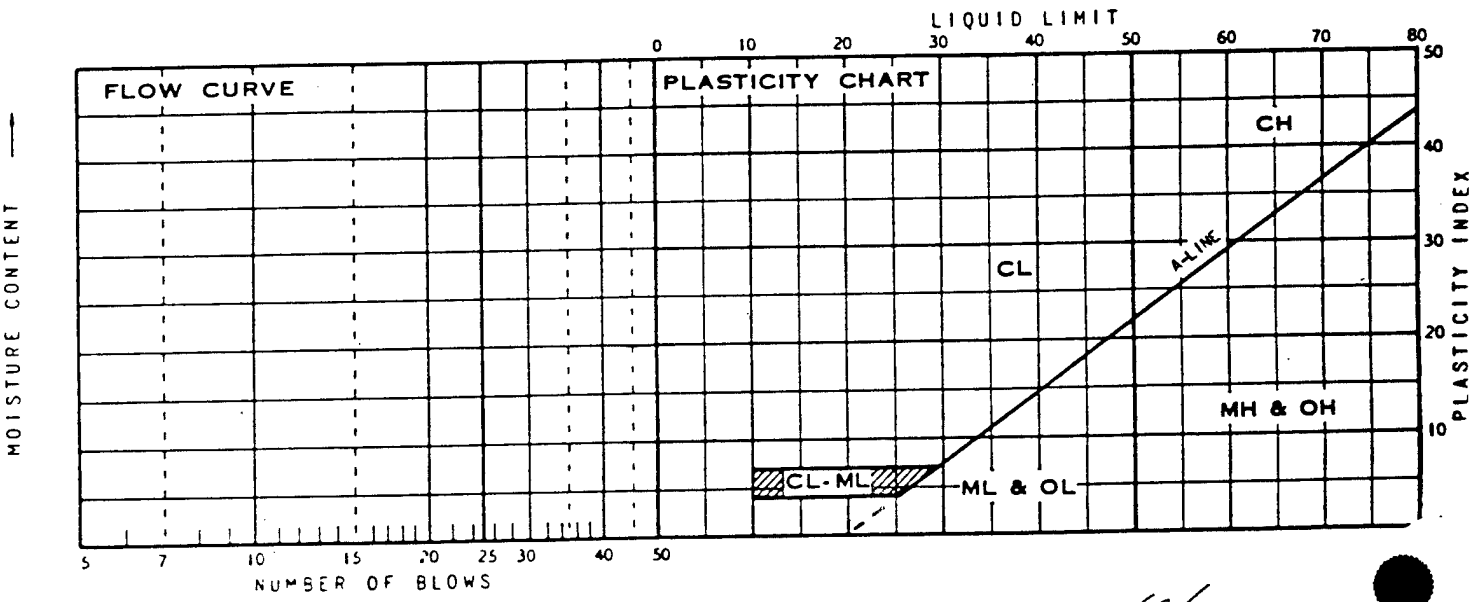
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RH.1 2594

DETERMINATION	1	2	3	4	5	6
DISH						
WT OF DISH + WET SOIL			NON PLASTIC			
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE			DIFFICULT TO THREAD			
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



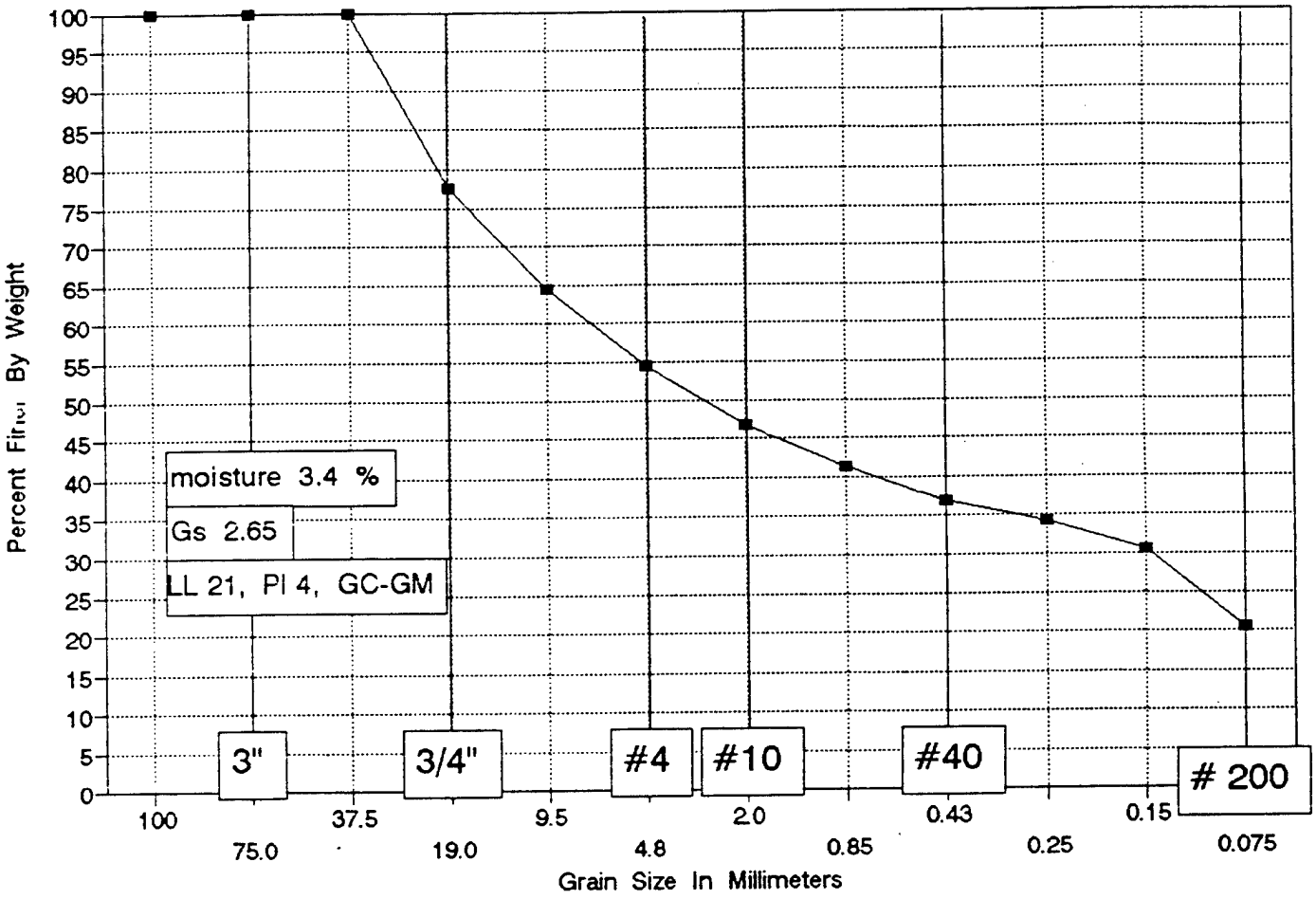
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SB-42-029, at 3.0-5.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-42-029
Sample at 3-5 feet

	totals
Wt soil and dish	114
Dry soil & dish	111.7
Dish	43.2
wet soil	494.9
dish	13.3
dry total	466.0

Moisture Content = 3.4 %

SIEVE ANALYSIS

Total sample dry = 466.0 g

Weight of sample split #4 55.7 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	105.12	77.44%	77.4	19.0
3/8 inch	165.43	64.50%	64.5	9.5
# 4	212.75	54.34%	54.3	4.8
# 10	7.87	46.66%	46.7	2.0
# 20	13.4	41.27%	41.3	0.85
# 40	17.97	36.81%	36.8	0.43
# 60	20.58	34.26%	34.3	0.25
# 100	24.37	30.57%	30.6	0.15
# 200	34.65	20.54%	20.5	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/18/94

BORING GB-42 SAMPLE 029 DEPTH 3-5' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	494.9
WT. OF ~~RINGS~~ Dish	13.3
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/21 @ #4	1/22 @ #4	
PAN	A-8	217	96	
WT. OF PAN & WET SOIL	114.0	366.8	161.0	
WT. OF PAN & DRY SOIL	111.7	365.4	160.2	
WT. OF MOISTURE				
WT. OF PAN	43.2	115.4	104.5	
WT. OF DRY SOIL				
MOISTURE CONTENT %	3.4			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		105.12			
☐			3/8"		165.43			
☑			#4		212.75			
☐			#10		7.87			
☐			#20		13.40			
☑			#40		17.97			
☐			#60		20.58			
☐			#100		24.37			
☐			#200		34.65			
☐								
☐								

AL only

(10)

NOTE: Gs 2.65

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER MONTGOMERY WATSON

LOCATION LEAD-N REI

BORING SB-42 SAMPLE 029 DEPTH 3-5'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

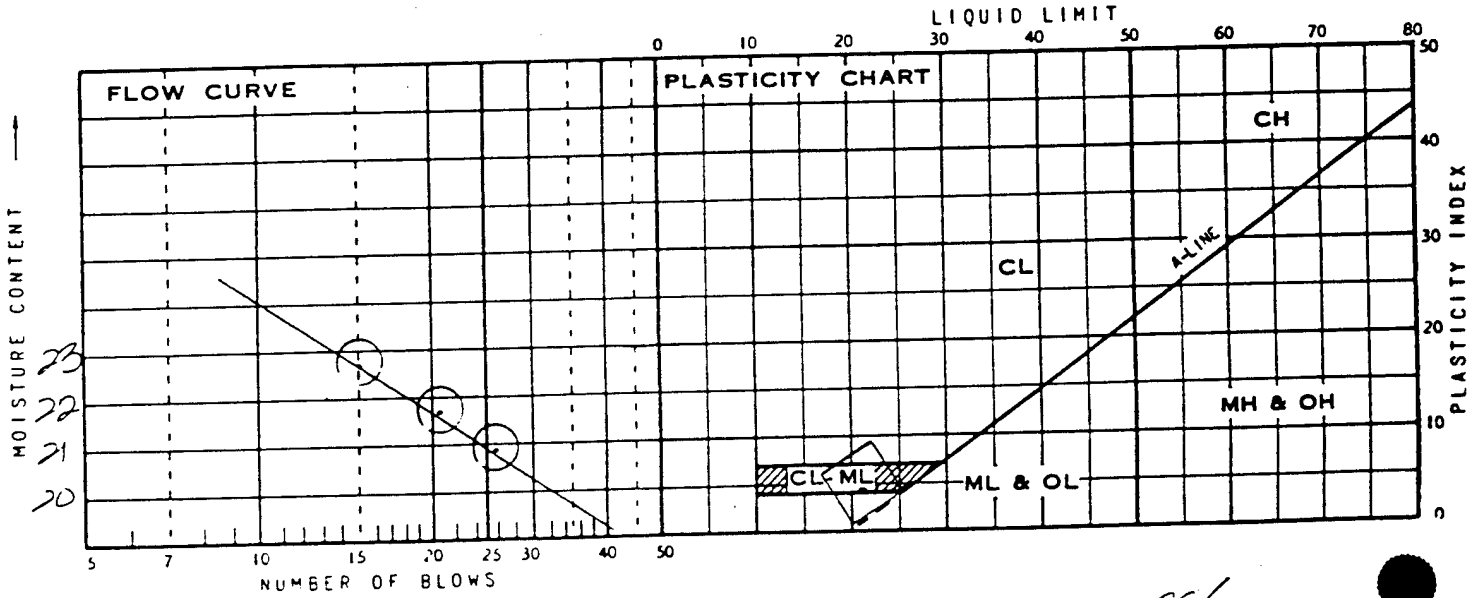
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RH 1.25.94

DETERMINATION	1	2	3	4	5	6
DISH	79	AL-127				
WT OF DISH + WET SOIL	7.89	8.57				
WT OF DISH + DRY SOIL	6.92	7.51	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	17.57	17.35	AV = 17			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	46	AL-79	106			
NUMBER OF BLOWS	26	21	15			
WT OF DISH + WET SOIL	11.45	14.01	13.81			
WT OF DISH + DRY SOIL	9.71	11.75	11.50	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	20.94	21.84	22.87			



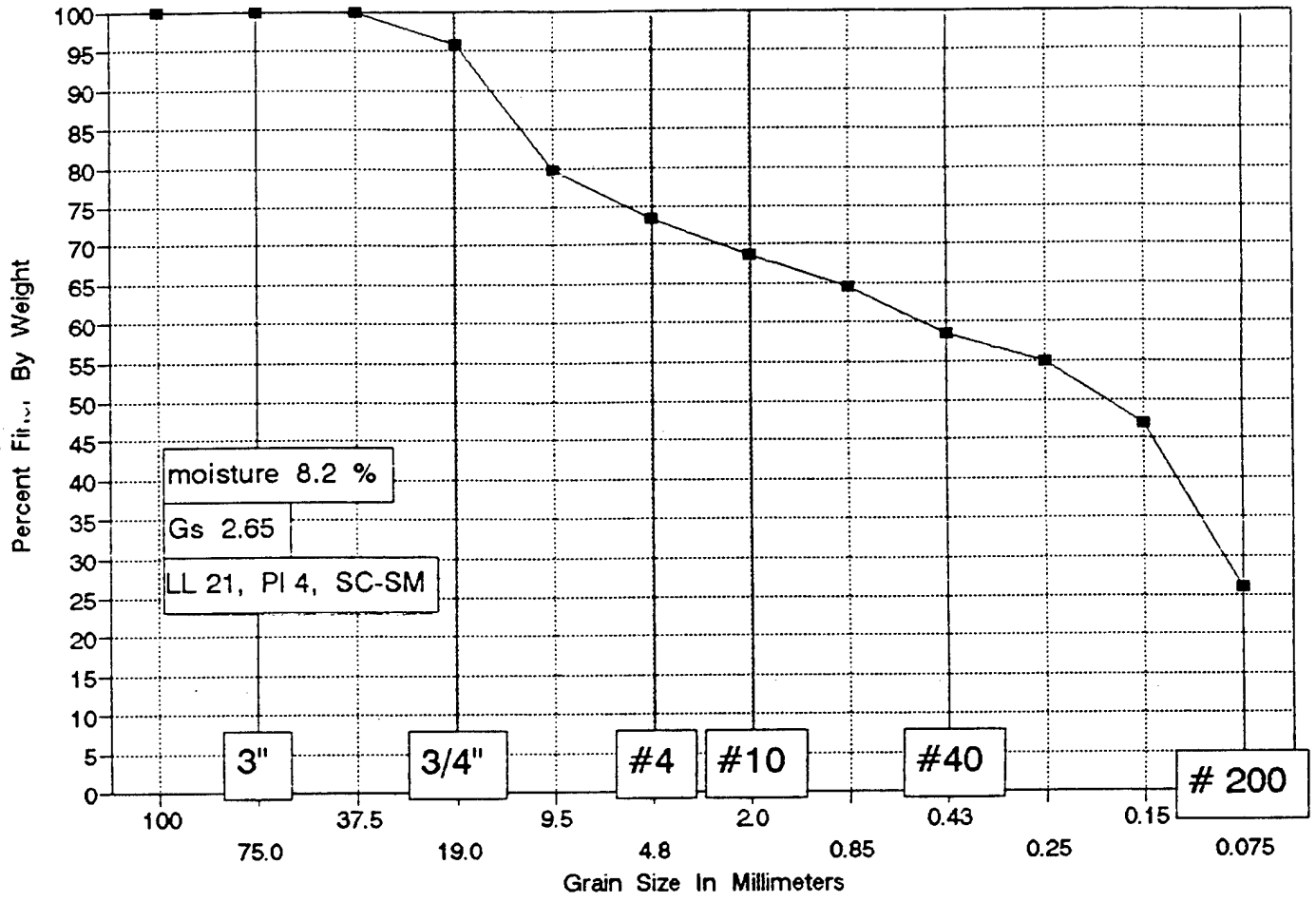
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		21	17	4	CL-ML	

DAMES & MOORE

GRADATION CURVE

Location SB-42-033A, at 0.0-2.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-42-033A
Sample at 0-2 feet

	totals
Wt soil and dish	99.4
Dry soil & dish	95.2
Dish	43.8
wet soil	428.1
dish	13.8
dry total	383.0

Moisture Content = 8.2 %

SIEVE ANALYSIS

Total sample dry = 383.0 g

Weight of sample split #4 59.9 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	16.07	95.80%	95.8	19.0
3/8 inch	77.68	79.72%	79.7	9.5
# 4	102.06	73.35%	73.4	4.8
# 10	3.72	68.80%	68.8	2.0
# 20	7.29	64.43%	64.4	0.85
# 40	12.08	58.56%	58.6	0.43
# 60	15.02	54.96%	55.0	0.25
# 100	21.51	47.01%	47.0	0.15
# 200	38.61	26.07%	26.1	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/18/94

BORING CB-42 SAMPLE 033A DEPTH 0-2.0' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT=	DIAMETER=
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	428.1
WT. OF ~~RINGS~~ DISH	13.8
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/21 ~~D~~#4	1/22 ~~D~~#4	
PAN	1-9	205	215	
WT. OF PAN & WET SOIL	99.4	267.4	172.5	
WT. OF PAN & DRY SOIL	95.2	265.9	171.3	
WT. OF MOISTURE				
WT. OF PAN	43.8	111.5	111.4	
WT. OF DRY SOIL				
MOISTURE CONTENT %	8.2			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		16.07			
☐			3/8"		77.63			
☑			#4		102.06			
☐			#10		3.72			
☐			#20		7.29			
☑ AL ONLY			#40		12.08			
☐			#60		15.02			
☐			#100		21.51			
☐			#200		30.61			
☐								
☐								

(11)

NOTE: Gs 2.65

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER MONTGOMERY WATSON

LOCATION TEED-N RFI

BORING SB-42 SAMPLE 033A DEPTH 0-2

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

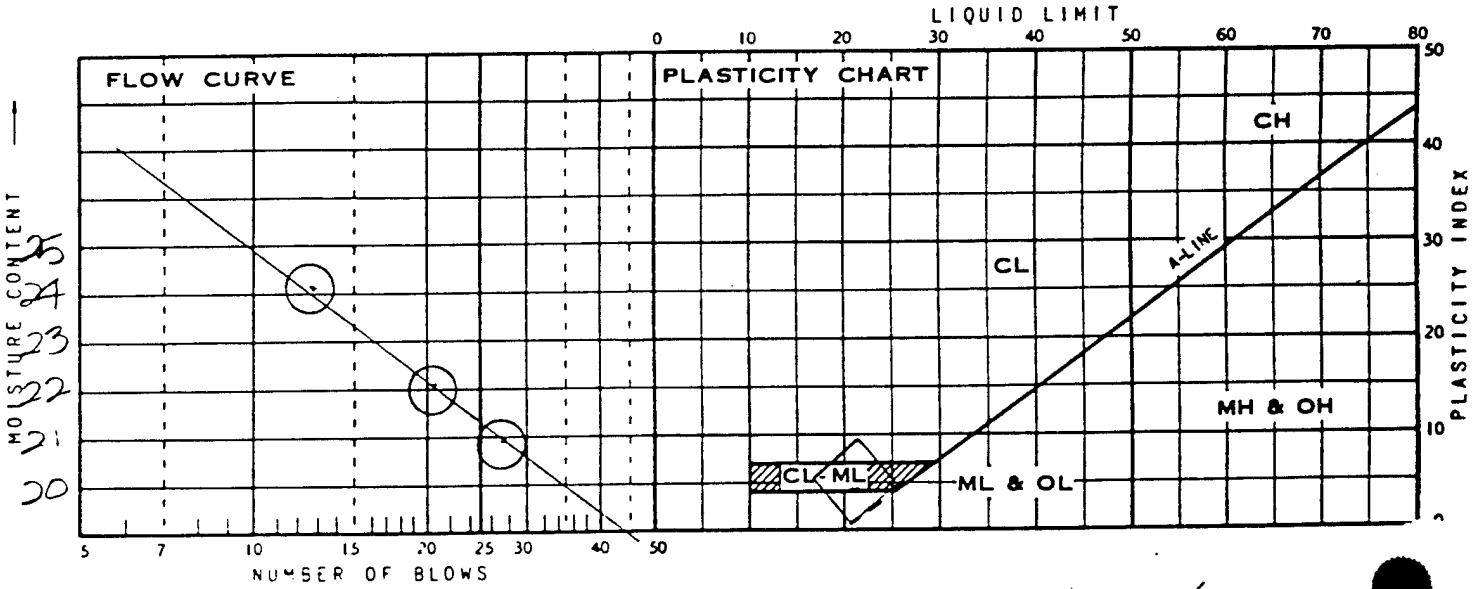
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RH 1/25/94

DETERMINATION	1	2	3	4	5	6
DISH	104	AL-115				
WT OF DISH + WET SOIL	11.29	11.94				
WT OF DISH + DRY SOIL	9.86	10.41	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	16.90	16.98	AV=17			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	AL-111	113	42			
NUMBER OF BLOWS	28	21	13			
WT OF DISH + WET SOIL	15.22	15.58	14.39			
WT OF DISH + DRY SOIL	12.83	13.02	11.87	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	20.91	22.03	24.07			



SUMMARY

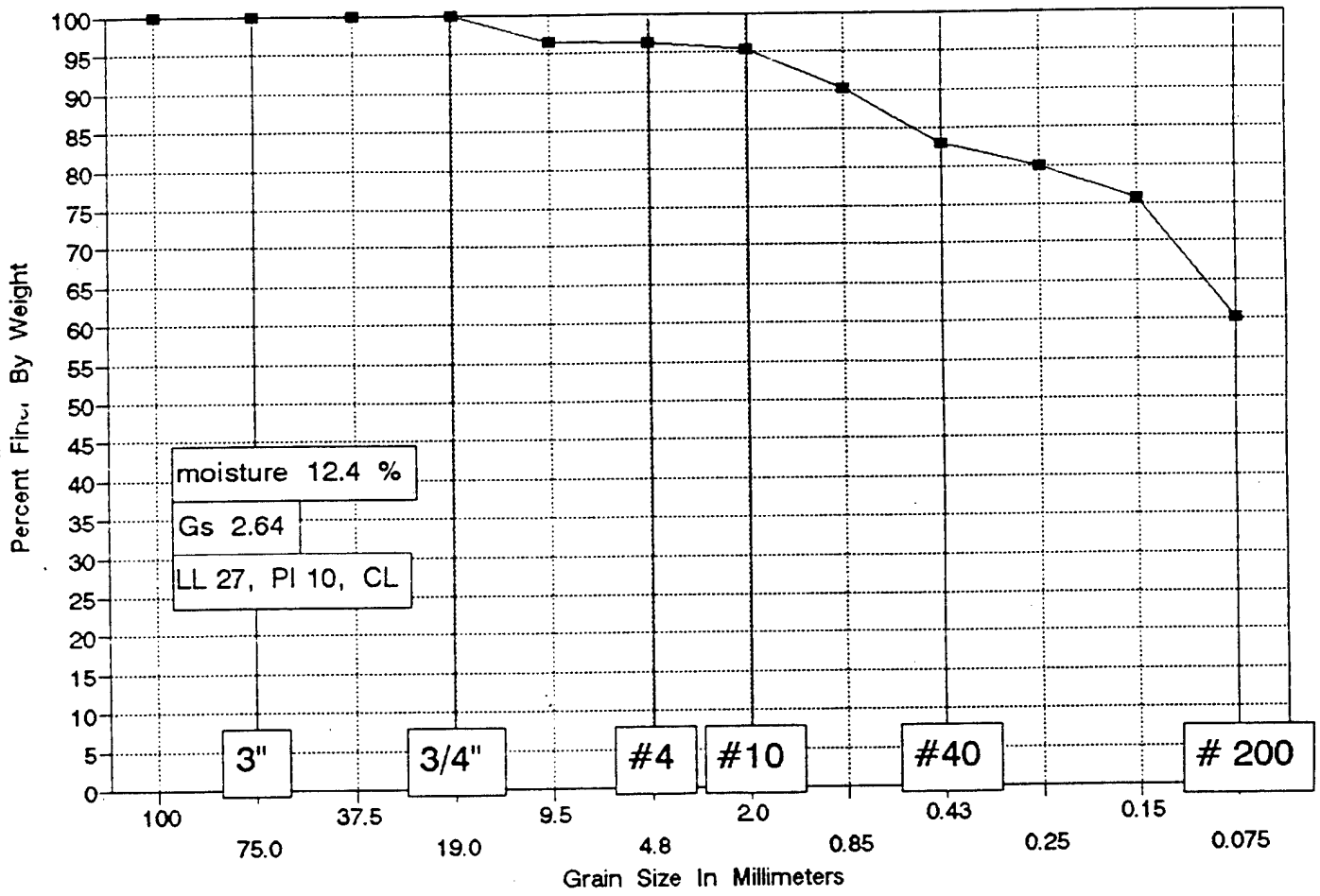
EGH

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		21	17	4	CL-ML	

DAMES & MOORE

GRADATION CURVE

Boring SB-42, sample 037A at 0.0-2.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-42
Sample 037A
at a depth of 0.0-2.0 feet

Moisture Content = 12.4 %

	totals
Wt soil and dish	117.5
Dry soil & dish	109.3
Dish	43.3
wet soil	377.2
dish	13.5
dry total	323.5

SIEVE ANALYSIS

Total sample dry = 323.5 g

Weight of sample split #4 85.8 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	11	96.60%	96.6	9.5
# 4	11.51	96.44%	96.4	4.8
# 10	0.94	95.39%	95.4	2.0
# 20	5.5	90.26%	90.3	0.85
# 40	11.94	83.02%	83.0	0.43
# 60	14.65	79.98%	80.0	0.25
# 100	18.57	75.57%	75.6	0.15
# 200	32.25	60.19%	60.2	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING GB-42 SAMPLE 037A DEPTH 0.0-2.0' BY LAF

JAR ~~DENSITY~~	Total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	377.2
WT. OF ~~RINGS~~ DCh	135
WT. OF WET SOIL	/
FIELD DENSITY	/
DRY DENSITY	/

MOISTURE ANALYSIS	M.C.	1/22 ⊕ #4	1/25 ⊖ #4	
PAN	L-7	169	122	
WT. OF PAN & WET SOIL	117.5	183.8	194.9	
WT. OF PAN & DRY SOIL	109.3	181.4	193.1	
WT. OF MOISTURE				
WT. OF PAN	43.3	107.9	107.3	
WT. OF DRY SOIL				
MOISTURE CONTENT %	12.4	—	2.1	

SAMPLE CONTAINER GRAB TOTAL WEIGHT OF OVEN DRIED SAMPLE 323.5

TOTAL WEIGHT OF BULK SAMPLE (LBS) — DRY SIEVE — WASH SIEVE —

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"		0			
☐			3/8"		11.00			
☑			#4		11.51			
☐			#10		.94			
☐			#20		5.50			
☑			#40		11.94			
☐			#60		14.65			
☐			#100		18.57			
☐			#200		32.25			
☐								
☐								

al only

(12)

NOTE: $G_s = 2.64$

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER [redacted]

LOCATION [redacted]

BORING [redacted] SAMPLE [redacted] DEPTH [redacted]

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

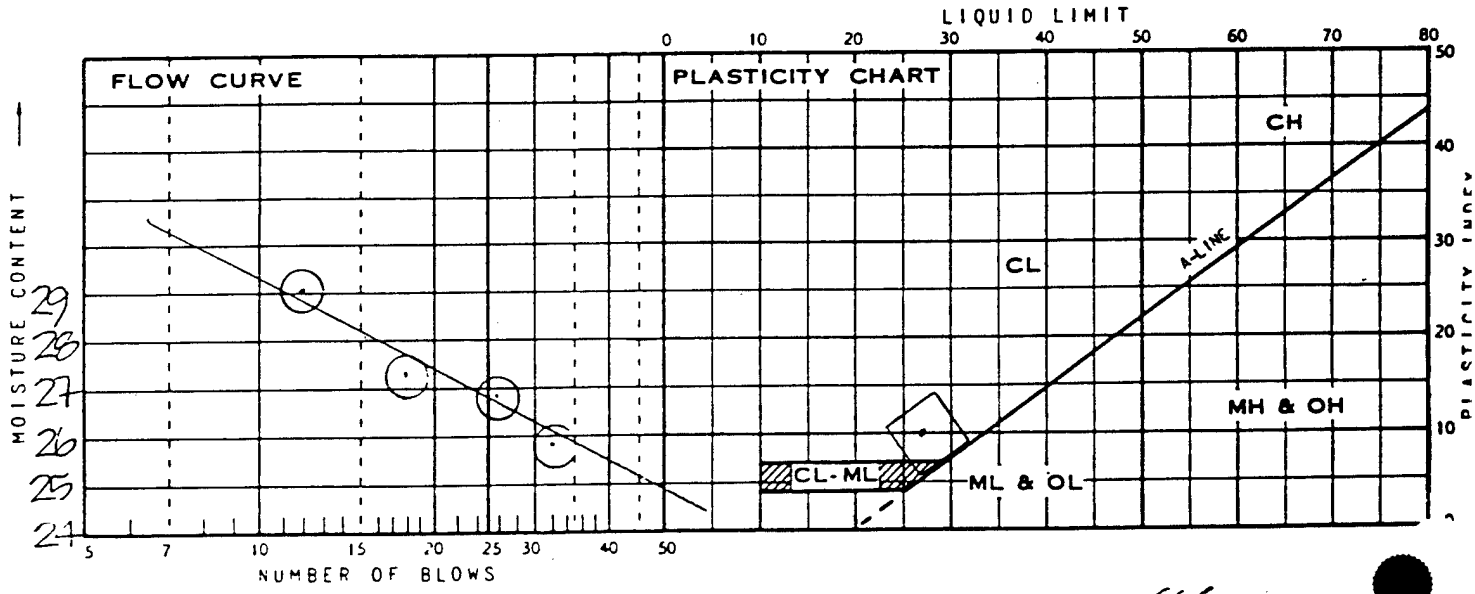
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [redacted]

DETERMINATION	1	2	3	4	5	6
DISH	121	3				
WT OF DISH + WET SOIL	10.22	11.37				
WT OF DISH + DRY SOIL	8.91	9.93	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.41	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	17.44	16.85	$\bar{X}$= 17			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	115	91	35	54		
NUMBER OF BLOWS	32	26	18	12		
WT OF DISH + WET SOIL	14.31	13.88	13.44	22.73		
WT OF DISH + DRY SOIL	11.66	11.24	10.86	17.93	—	—
WT OF MOISTURE						
WT OF DISH	1.39	1.40	1.41	1.41	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	25.83	26.83	27.27	29.04		



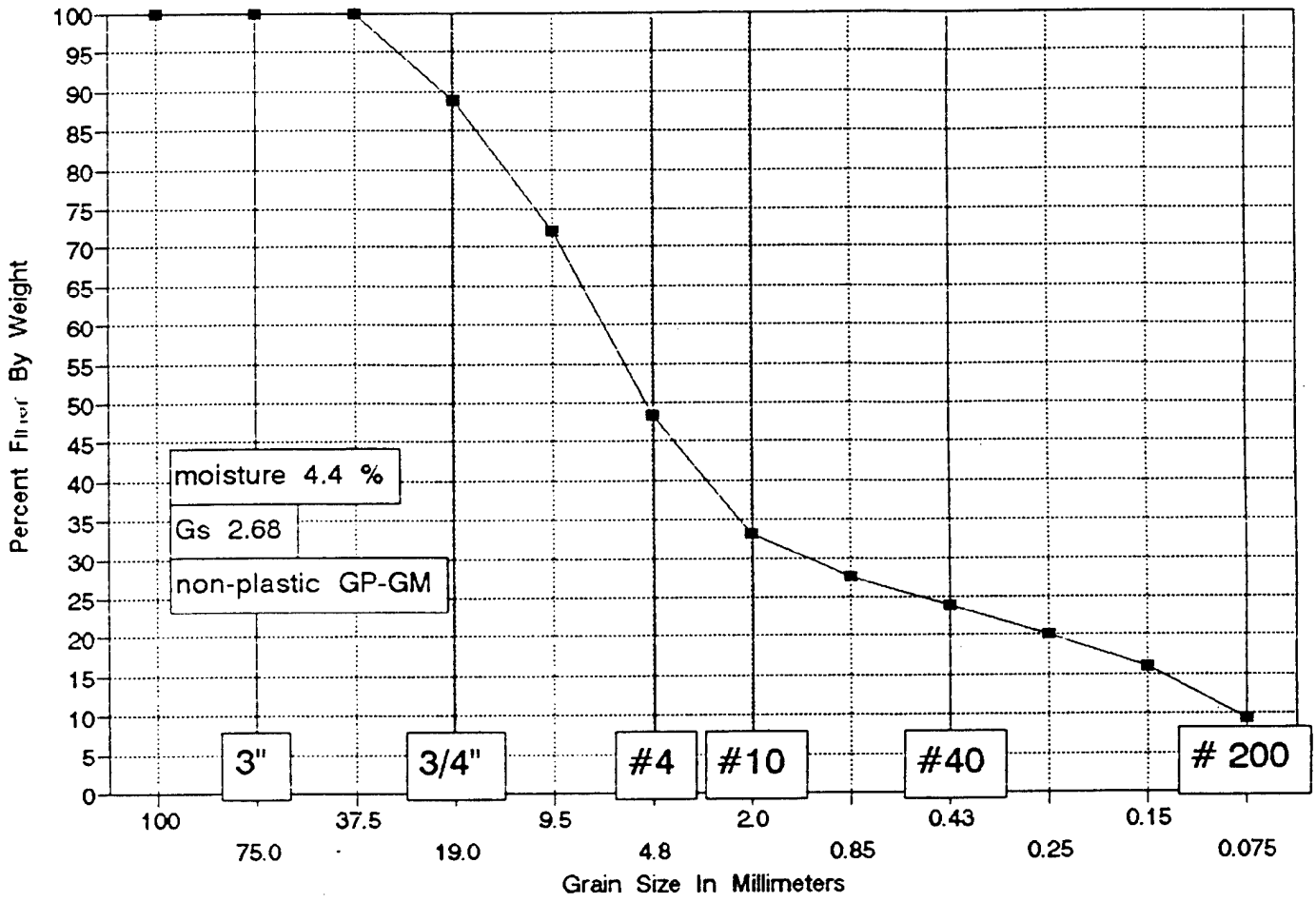
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		27	17	10	CL	

DAMES & MOORE

GRADATION CURVE

Location SB-42-046B, at 3.0-5.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-42-046B
Sample at 3-5 feet

Moisture Content = 4.4 %

	totals
Wt soil and dish	128.3
Dry soil & dish	124.7
Dish	43.6
wet soil	506.7
dish	13.4
dry total	472.3

SIEVE ANALYSIS

Total sample dry = 472.3 g

Weight of sample split #4 77.8 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	52.22	88.94%	88.9	19.0
3/8 inch	131.8	72.10%	72.1	9.5
# 4	243.97	48.35%	48.3	4.8
# 10	24.5	33.12%	33.1	2.0
# 20	33.41	27.59%	27.6	0.85
# 40	39.62	23.73%	23.7	0.43
# 60	45.46	20.10%	20.1	0.25
# 100	51.7	16.22%	16.2	0.15
# 200	62.56	9.47%	9.5	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING SB-42 SAMPLE 046B DEPTH 3-5' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	506.7
WT. OF ~~RINGS~~ DKh	134
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/22 ~~D~~ #4	1/25 ~~D~~ #4	
PAN	G-41	GT-23	313	
WT. OF PAN & WET SOIL	128.3	370.9	190.9	
WT. OF PAN & DRY SOIL	124.7	307.1	190.0	
WT. OF MOISTURE				
WT. OF PAN	43.6	110.7	112.2	
WT. OF DRY SOIL				
MOISTURE CONTENT %	4.4			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		52.22			
☐			3/8"		131.80			
☑			#4		243.97			
☐			#10		24.50			
☐			#20		33.41			
☑			#40		39.62			
☐			#60		45.46			
☐			#100		51.70			
☐			#200		62.56			
☐								
☐								

AL only

(13)

NOTE: G_s 2.68

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER MONTGOMERY/WATSON

LOCATION TEAD N RR1

BORING SB-42 SAMPLE CA10B DEPTH 3-5'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

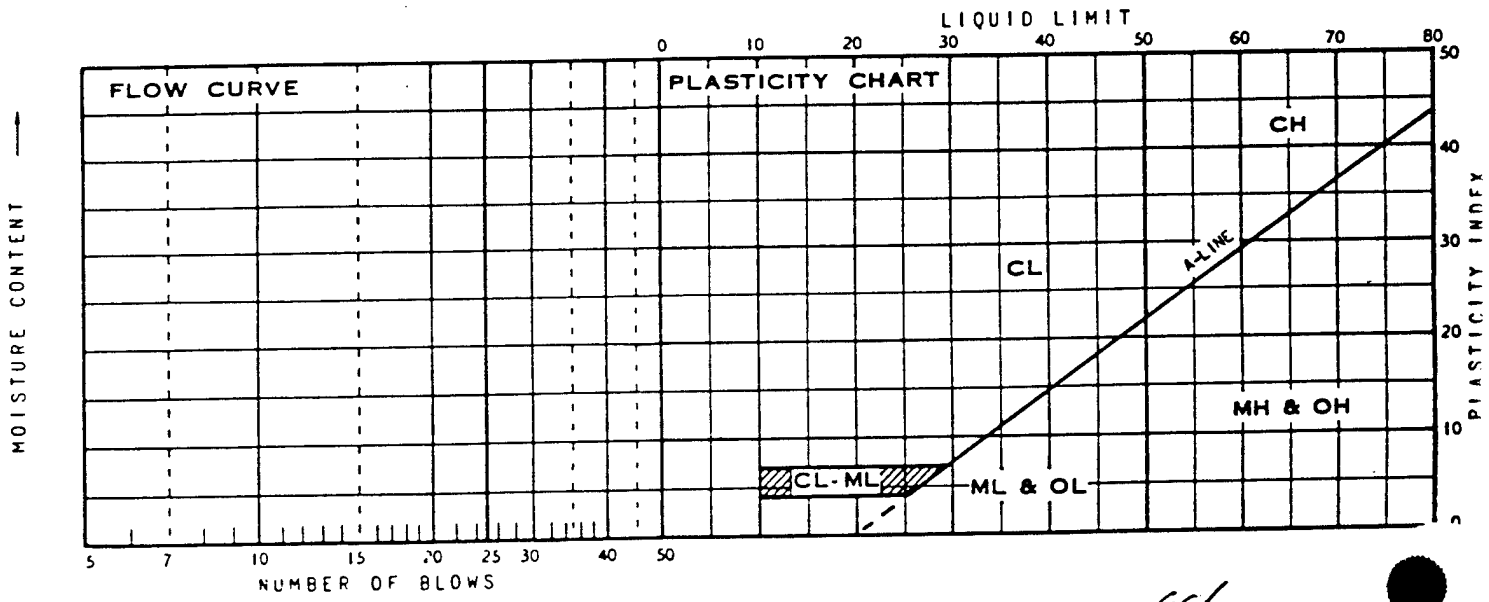
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY ___/__/__

DETERMINATION	1	2	3	4	5	6
DISH			NON PLASTIC			
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	DIFFICULT TO THREAD			—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



SUMMARY

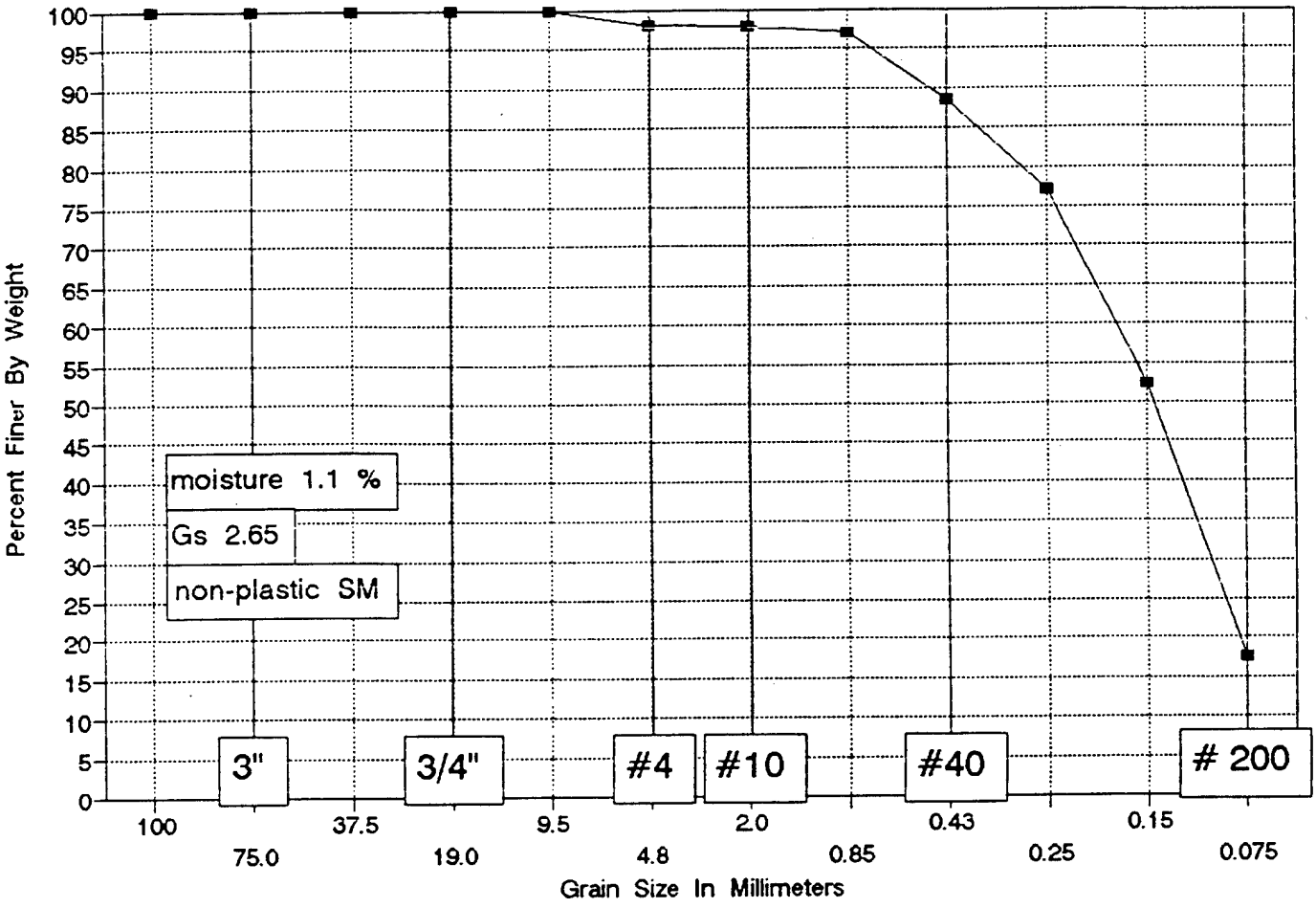
Ekd

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SS-37-016, at 0.0-0.5 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SS-37-016
Sample at 0-0.5 feet

Moisture Content = 1.1 %

	totals
Wt soil and dish	72.3
Dry soil & dish	72
Dish	43.5
wet soil	177.3
dish	11.3
dry total	164.3

SIEVE ANALYSIS

Total sample dry = 164.3 g

Weight of sample split #4 67 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	0	100.00%	100.0	9.5
# 4	3.33	97.97%	98.0	4.8
# 10	0.08	97.86%	97.9	2.0
# 20	0.58	97.12%	97.1	0.85
# 40	6.44	88.56%	88.6	0.43
# 60	14.18	77.24%	77.2	0.25
# 100	31.17	52.39%	52.4	0.15
# 200	54.99	17.56%	17.6	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING SS-37 SAMPLE 016 DEPTH 0-0.5' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	177.3
WT. OF ~~RINGS~~ DKb	11.3
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/22 #4	1/25 #4	
PAN	E10	201	9	
WT. OF PAN & WET SOIL	72.3	114.4	174.6	
WT. OF PAN & DRY SOIL	72.0	114.2	173.4	
WT. OF MOISTURE				
WT. OF PAN	43.5	111.1	106.4	
WT. OF DRY SOIL				
MOISTURE CONTENT %	1.1			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"					
☐			3/8"		0			
☑			#4		3.33			
☐			#10		.08			
☐			#20		5.8			
☑ AL only			#40		6.44			
☐			#60		14.18			
☐			#100		31.17			
☐			#200		54.99			
☐								
☐								

(14)

NOTE: G_s 2.65

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Watson

LOCATION TEAD-N RFI/

BORING GS-37 SAMPLE -016 DEPTH 0-0.5'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

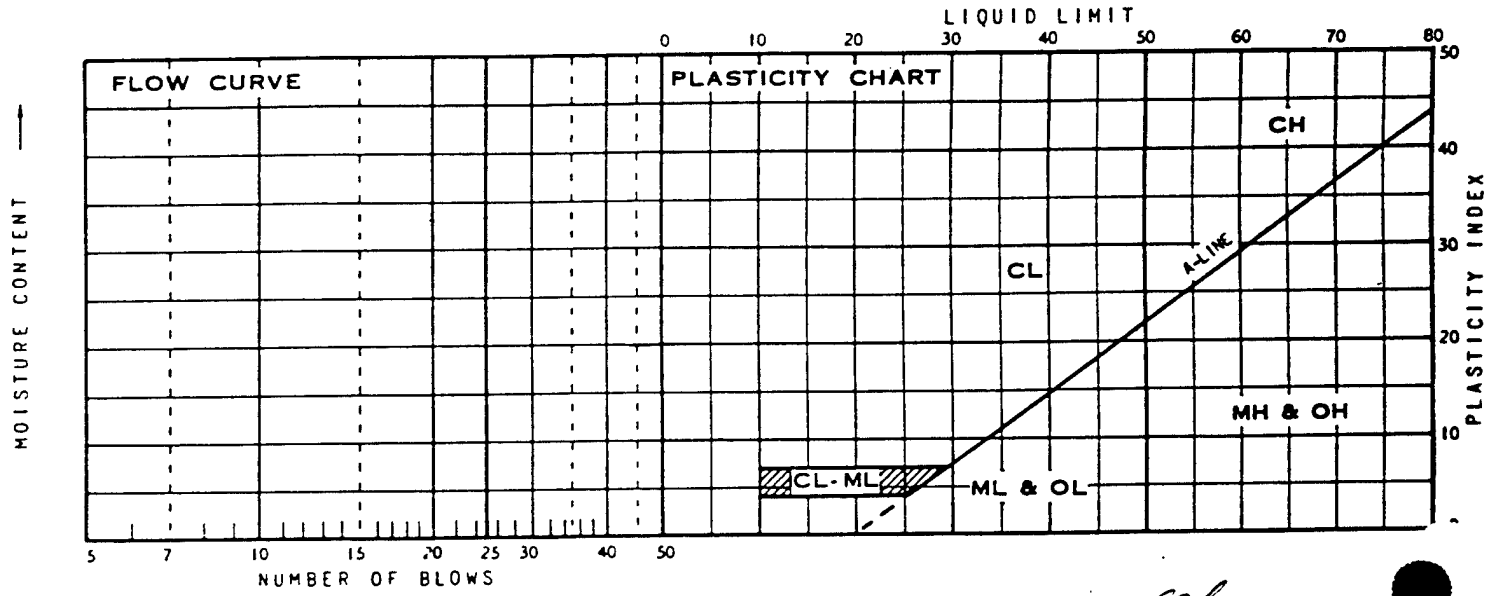
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY LAE 2-L94

DETERMINATION	1	2	3	4	5	6
DISH	33	10	could not thread			
WT OF DISH + WET SOIL				-sandy-		
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	AL95	133	AL120	could not get		
NUMBER OF BLOWS				adequate		
WT OF DISH + WET SOIL				blowcount		
WT OF DISH + DRY SOIL	—	—	—	—	(25)	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



SUMMARY

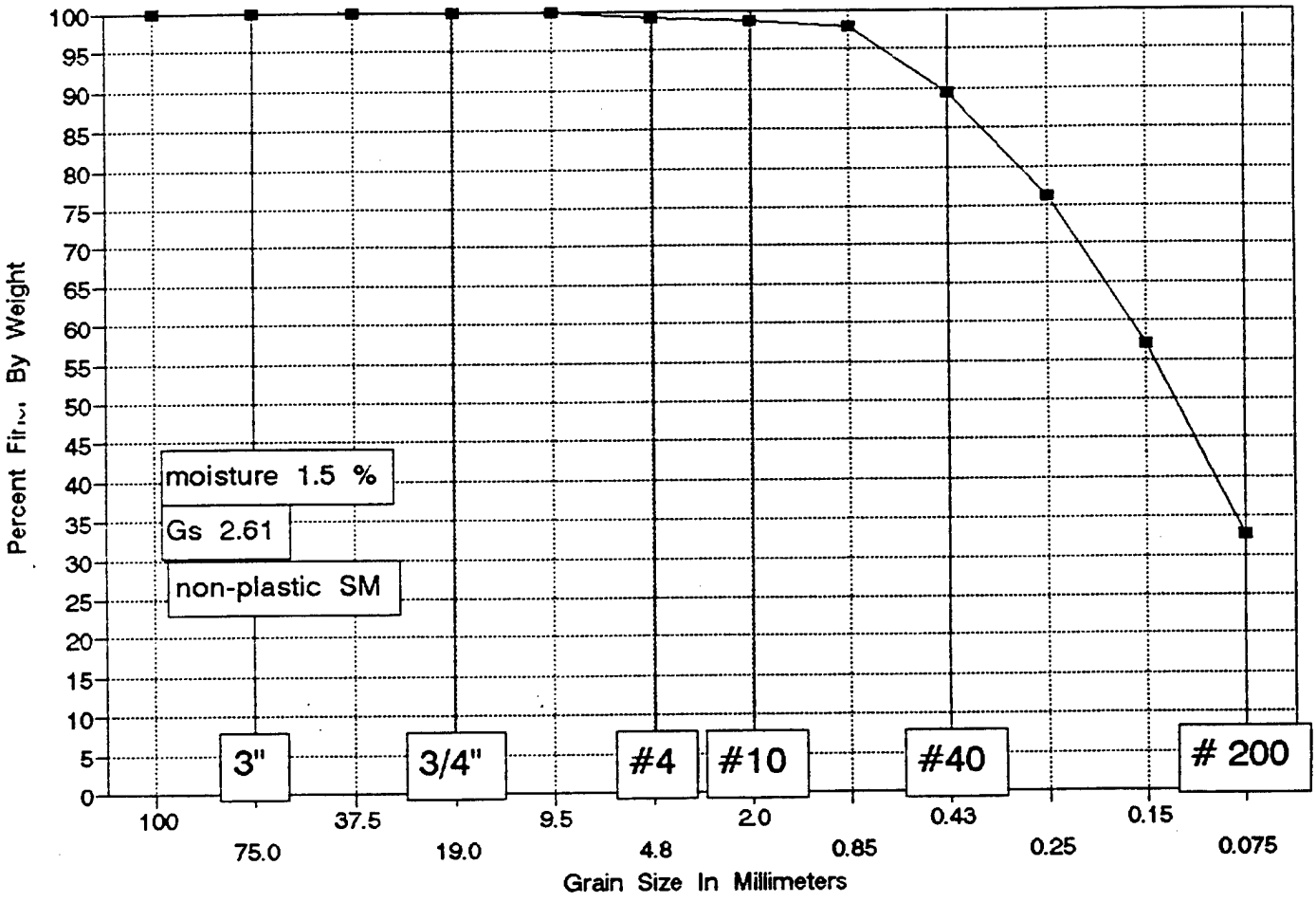
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DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SS-37-020, at 0.0-0.5 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SS-37-020
Sample at 0-0.5 feet

Moisture Content = 1.5 %

	totals
Wt soil and dish	71.2
Dry soil & dish	70.8
Dish	43.8
wet soil	161.3
dish	10.6
dry total	148.5

SIEVE ANALYSIS

Total sample dry = 148.5 g

Weight of sample split #4 59.9 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	0	100.00%	100.0	9.5
# 4	1.14	99.23%	99.2	4.8
# 10	0.33	98.69%	98.7	2.0
# 20	0.83	97.86%	97.9	0.85
# 40	5.91	89.44%	89.4	0.43
# 60	13.9	76.21%	76.2	0.25
# 100	25.51	56.97%	57.0	0.15
# 200	40.18	32.67%	32.7	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING SG-37 SAMPLE 020 DEPTH 0-0.5' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	161.3
WT. OF ~~RINGS~~ Dish	10.6
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/22 ⊖#4	1/25 ⊖#4	
PAN	A-50	316	95	
WT. OF PAN & WET SOIL	71.2	111.9	168.0	
WT. OF PAN & DRY SOIL	70.8	111.6	166.6	
WT. OF MOISTURE				
WT. OF PAN	43.8	110.7	106.7	
WT. OF DRY SOIL				
MOISTURE CONTENT %	1.5			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"					
☐			3/8"		0			
☑			#4		1.14			
☐			#10		.33			
☐			#20		.83			
☑			#40		5.91			
☐			#60		13.90			
☐			#100		25.51			
☐			#200		40.18			
☐								
☐								

(15)

gl only

NOTE: G_s 2.61

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATOPY CLASSIFICATION _____

CLIENT/OWNER Montgomery Watson

LOCATION TEAD-N RFI

BORING 42-37 SAMPLE 020 DEPTH 0-0.5'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

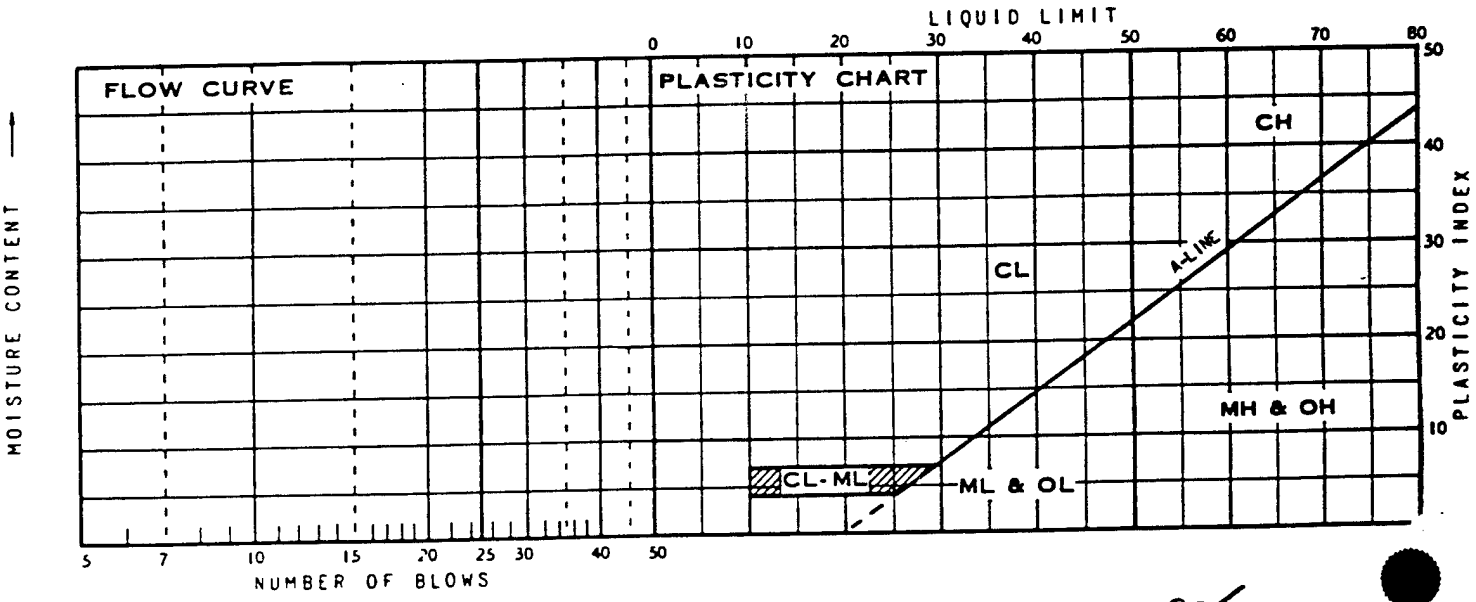
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY VAF 2/94

DETERMINATION	1	2	3	4	5	6
DISH	21	26	difficult to thread			
WT OF DISH + WET SOIL	6.22	9.24	- sandy material -			
WT OF DISH + DRY SOIL	7.12	8.04	— crumbles easily			—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	19.23	18.07	AV=19			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	117	A-2	A-3	could not get		
NUMBER OF BLOWS				adequate		
WT OF DISH + WET SOIL				blow count		
WT OF DISH + DRY SOIL	—	—	—	—	(25)	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



SUMMARY

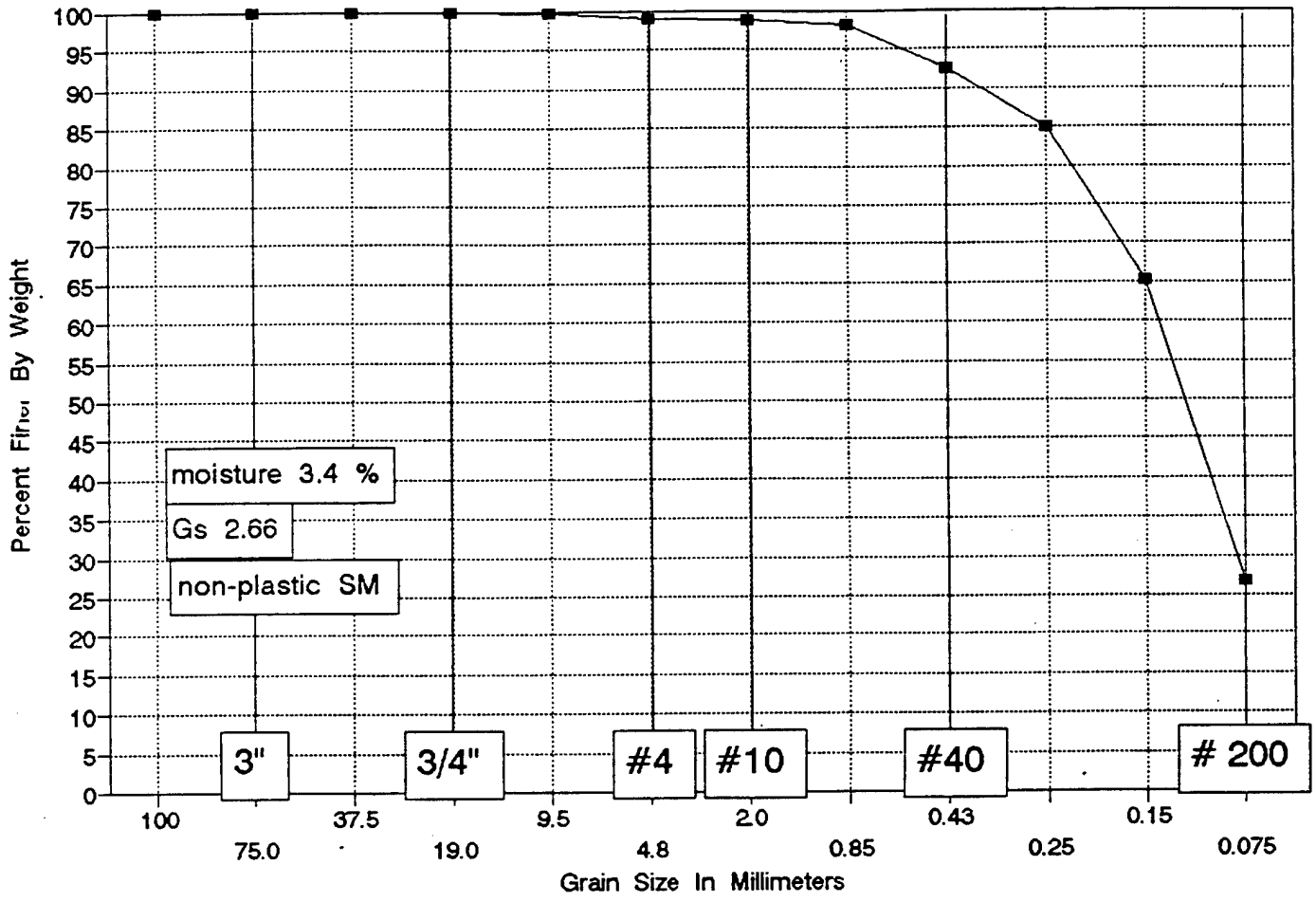
DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

ed

DAMES & MOORE

GRADATION CURVE

Location SB-37-003C, at 2.5-3.0 ft



Montgomery Watson
TEAD-N Phase II RFI

		totals
	Wt soil and dish	124.8
Boring SB-37-003C	Dry soil & dish	122.1
Sample at 2.5-3 feet	Dish	43.6
	wet soil	469.9
	dish	11.4
Moisture Content = 3.4 %	dry total	443.3

SIEVE ANALYSIS

Total sample dry = 443.3 g

Weight of sample split #4 114.7 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	1.14	99.74%	99.7	9.5
# 4	4.25	99.04%	99.0	4.8
# 10	0.36	98.73%	98.7	2.0
# 20	0.92	98.25%	98.2	0.85
# 40	7.37	92.68%	92.7	0.43
# 60	16.32	84.95%	84.9	0.25
# 100	39.18	65.21%	65.2	0.15
# 200	83.62	26.84%	26.8	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/18/94

BORING GB-37 SAMPLE 003C DEPTH 2.5-3.0' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	469.9
WT. OF ~~RINGS~~	Dish 114
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/21 A #4	1/22 E #4	
PAN	A-22	310	301	
WT. OF PAN & WET SOIL	124.3	145.4	230.4	
WT. OF PAN & DRY SOIL	122.1	144.9	229.1	
WT. OF MOISTURE				
WT. OF PAN	43.6	109.6	114.4	
WT. OF DRY SOIL				
MOISTURE CONTENT %	3.4			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"		0			
☐			3/8"		1.69			
☑			#4		4.25			
☐			#10		0.36			
☐			#20		0.92			
☑ AL only			#40		7.37			
☐			#60		16.32			
☐			#100		39.18			
☐			#200		83.62			
☐								
☐								

(16)

NOTE: G_s 2.66

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER MONTGOMERY WATSON

LOCATION LEAD - N RFI

BORING SB-37 SAMPLE 003C DEPTH 2.5-3'

FIELD DENSITY BY ___/___/___

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

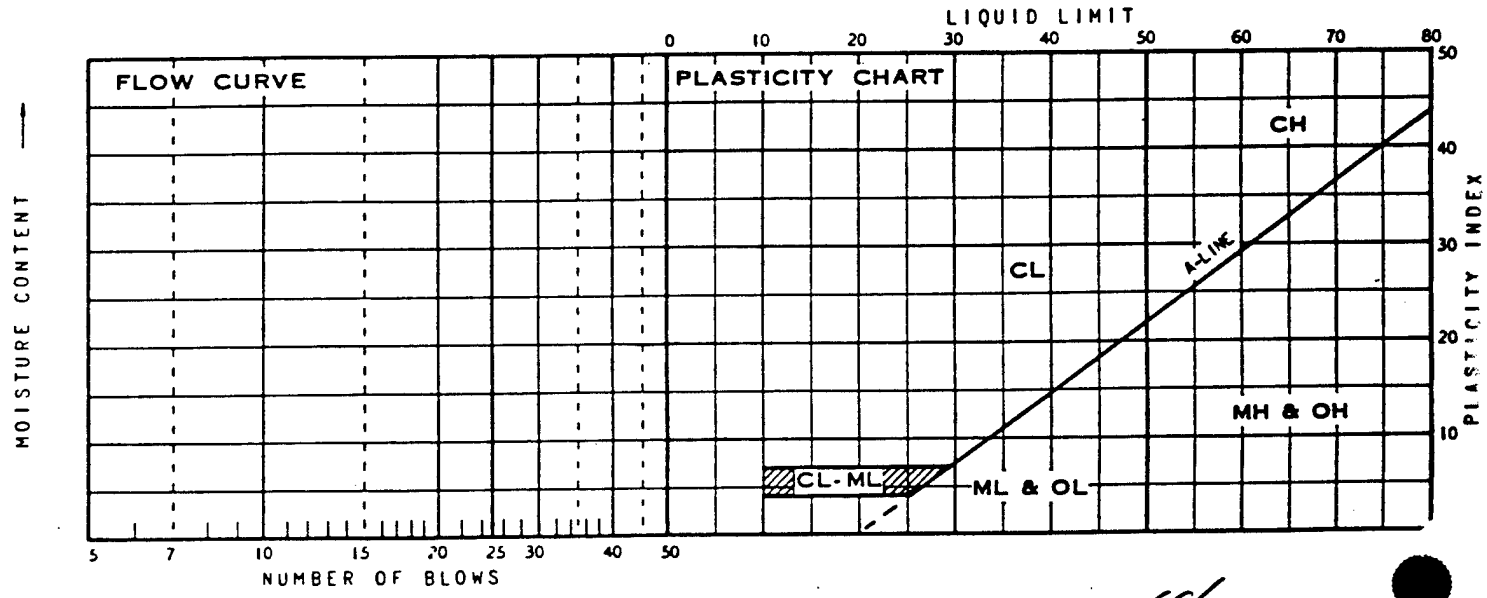
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RH.J. 25-94

DETERMINATION	1	2	3	4	5	6
DISH						
WT OF DISH + WET SOIL			NON-PLASTIC			
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	DIFFICULT TO THREAD			
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



SUMMARY

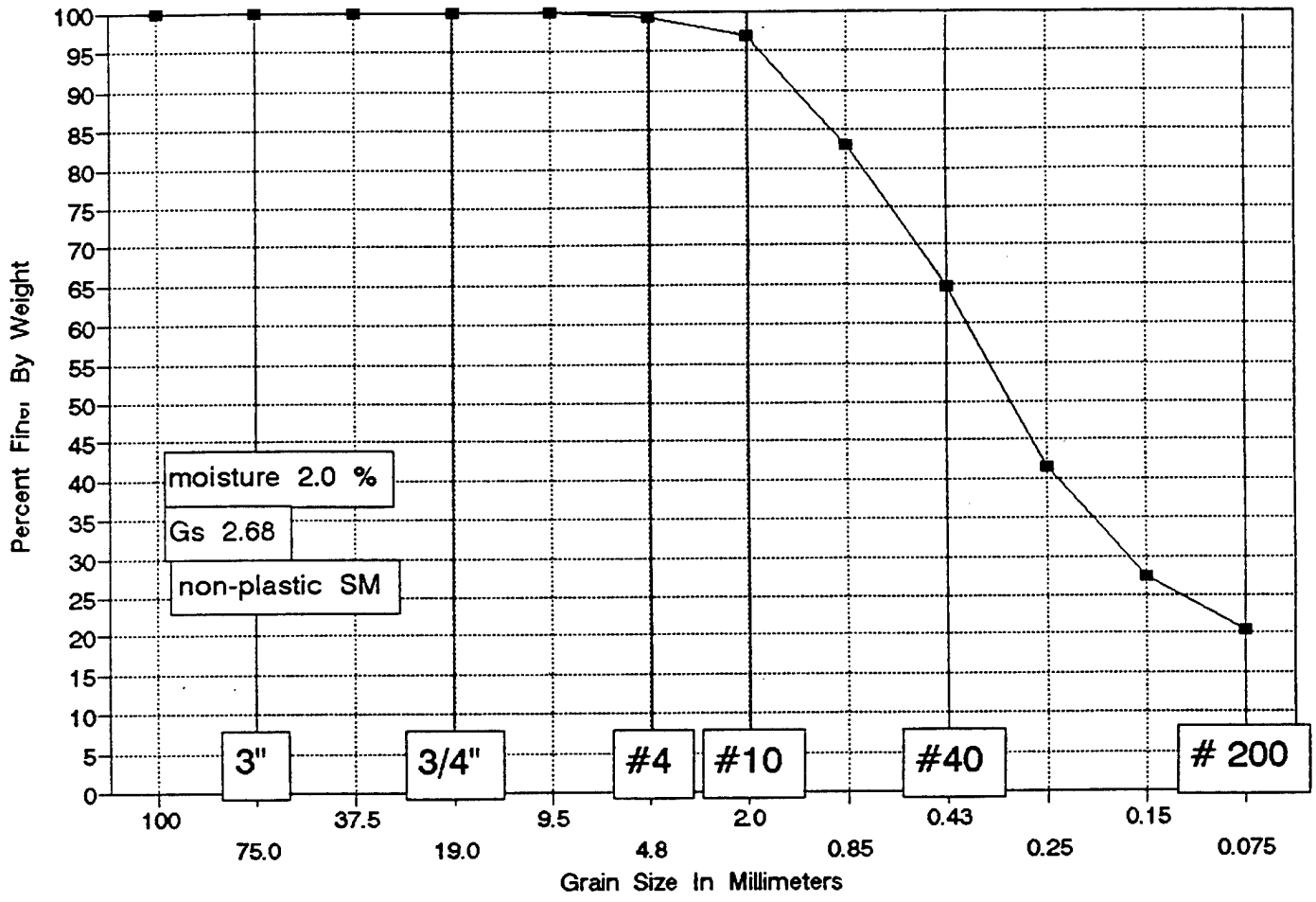
EGL

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SB-BK-011A, at 0.0-0.5 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-BK-011A
Sample at 0-0.5 feet

Moisture Content = 2.0 %

	totals
Wt soil and dish	73.5
Dry soil & dish	72.9
Dish	43.6
wet soil	158.6
dish	11.6
dry total	144.1

SIEVE ANALYSIS

Total sample dry = 144.1 g

Weight of sample split #4 38.7 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	0	100.00%	100.0	9.5
# 4	0.93	99.35%	99.4	4.8
# 10	0.97	96.86%	96.9	2.0
# 20	6.37	83.00%	83.0	0.85
# 40	13.55	64.57%	64.6	0.43
# 60	22.5	41.59%	41.6	0.25
# 100	28.04	27.37%	27.4	0.15
# 200	30.77	20.36%	20.4	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/18/94

BORING GB-BK SAMPLE 011A DEPTH 0-0.5' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	158.6
WT. OF ~~RINGS~~ DISH	11.6
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/21 ⊖#4	1/22 ⊖#4	
PAN	G-41	210	41	
WT. OF PAN & WET SOIL	73.5	112.2	145.7	
WT. OF PAN & DRY SOIL	72.9	111.9	145.2	
WT. OF MOISTURE				
WT. OF PAN	43.6	111.3	106.5	
WT. OF DRY SOIL				
MOISTURE CONTENT %	2.0			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"					
☐			3/8"		0			
☑			#4		0.93			
☐			#10		0.97			
☐			#20		6.37			
☑			#40		13.55			
☐			#60		22.15			
☐			#100		28.04			
☐			#200		30.77			
☐								
☐								

al only

(17)

NOTE: Gs 2.68

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

LABORATORY CLASSIFICATION _ _ _ _ _ _ _ _ _ _ _ _ _

CLIENT/OWNER MONTGOMERY WATSON

LOCATION LEAD-N REF

BORING SB-BK SAMPLE 011A DEPTH 0-0.5

FIELD DENSITY BY _ _ _ _ _ / _ / _

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

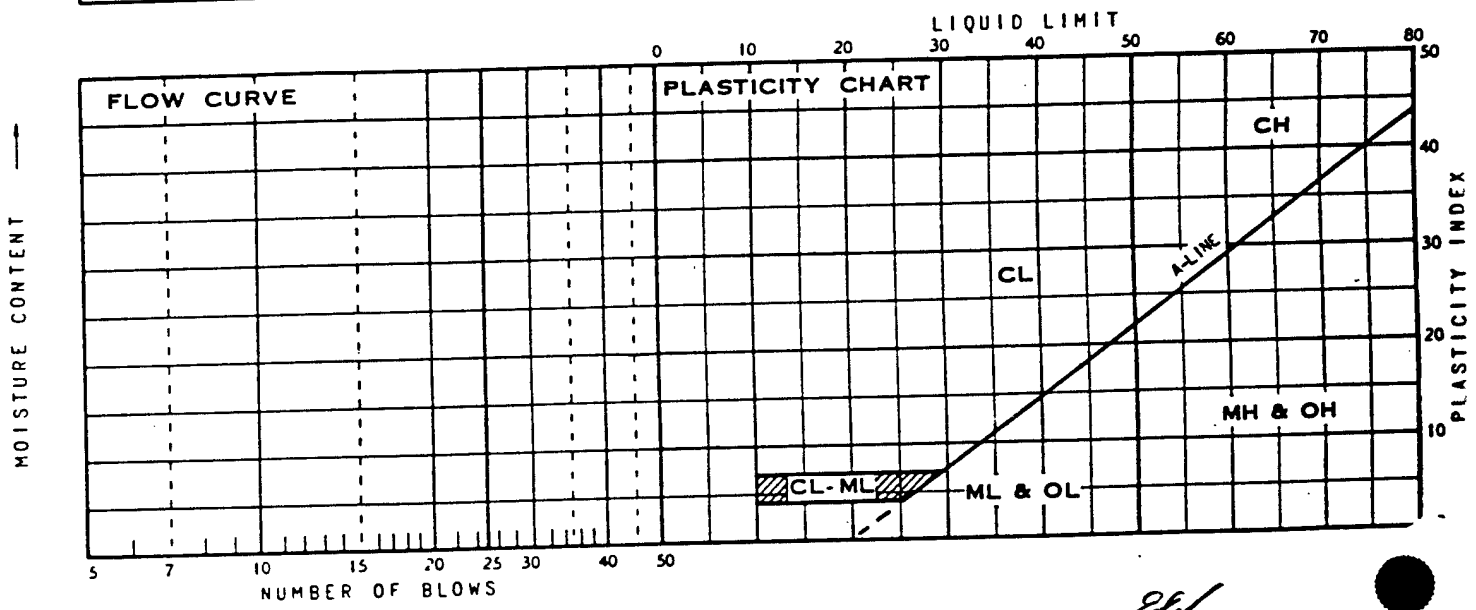
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RH 12594

DETERMINATION	1	2	3	4	5	6
DISH						
WT OF DISH + WET SOIL			NON-PLASTIC			
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	DIFFICULT TO THREAD			—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



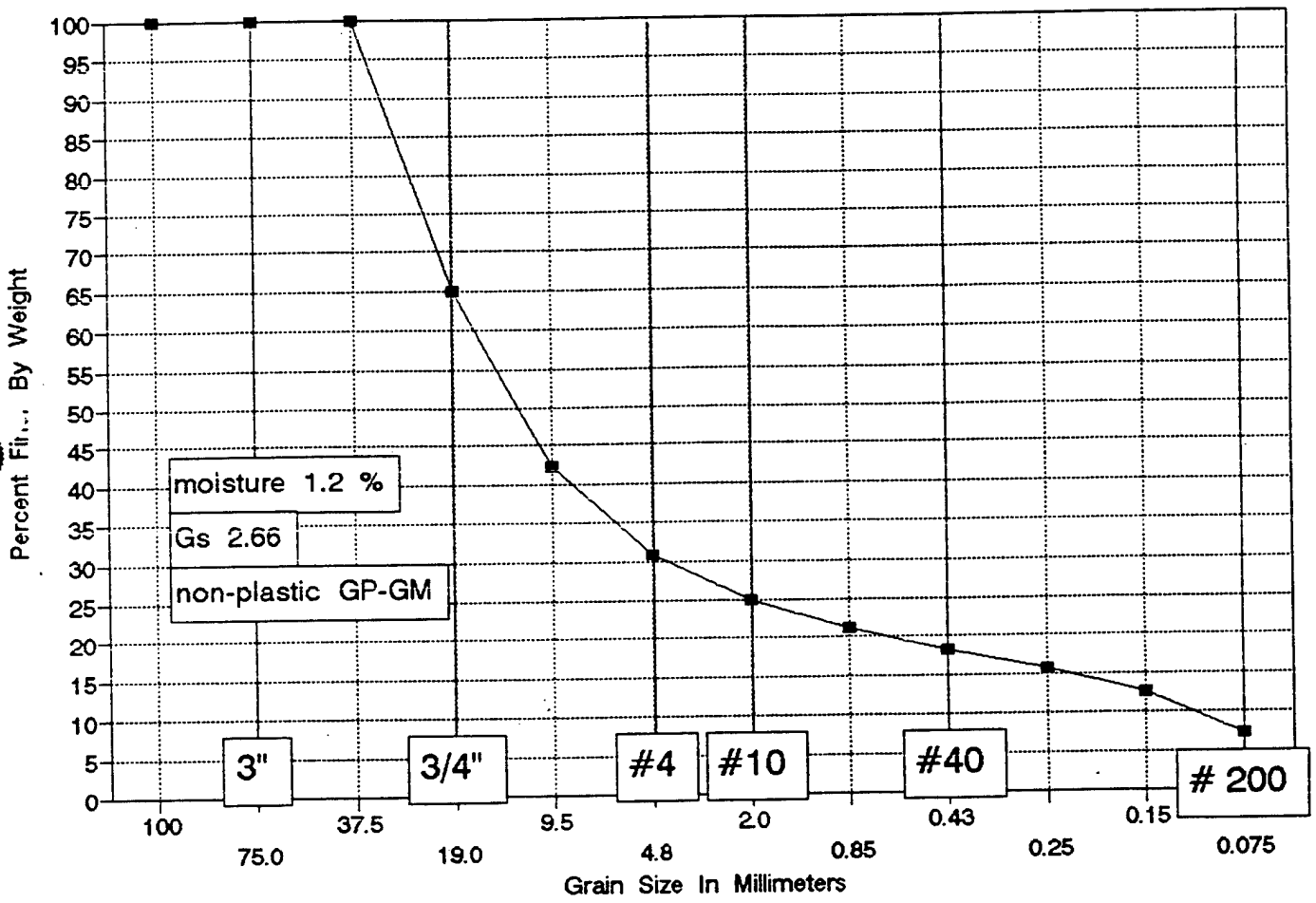
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SB-34-001A, at 0.0-2.0 ft



Montgomery Watson
TEAD-N Phase II RFI

		totals
	Wt soil and dish	108.7
Boring SB-34-001A	Dry soil & dish	107.9
Sample at 0-2 feet	Dish	43.4
	wet soil	591.5
	dish	10
Moisture Content = 1.2 %	dry total	574.4

SIEVE ANALYSIS

Total sample dry = 574.4 g

Weight of sample split #4 36.5 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	201.43	64.93%	64.9	19.0
3/8 inch	331.9	42.22%	42.2	9.5
# 4	396.9	30.90%	30.9	4.8
# 10	6.97	25.00%	25.0	2.0
# 20	11.38	21.27%	21.3	0.85
# 40	15.12	18.10%	18.1	0.43
# 60	17.79	15.84%	15.8	0.25
# 100	21.58	12.63%	12.6	0.15
# 200	27.93	7.25%	7.3	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/18/94

BORING GB-34 SAMPLE 001A DEPTH 0.0-2.0 BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT=	DIAMETER=
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	591.5
WT. OF ~~RINGS~~ DKh	10.0
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/21 #4	1/22 #4	
PAN	E8	GT-25	300	
WT. OF PAN & WET SOIL	108.7	535.3	152.0	
WT. OF PAN & DRY SOIL	107.9	533.9	151.4	
WT. OF MOISTURE				
WT. OF PAN	43.4	109.7	114.9	
WT. OF DRY SOIL				
MOISTURE CONTENT %	1.2			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		201.43			
☐			3/8"		331.9			
☑			#4		396.9			
☐			#10		6.97			
☐			#20		11.38			
☑ GL only			#40		15.12			
☐			#60		17.79			
☐			#100		21.53			
☐			#200		27.93			
☐								
☐								

(18)

NOTE: G_s 2.66

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER MONTGOMERY WATSON

LOCATION TEAD-N RFI

BORING SB-34 SAMPLE 0014 DEPTH 0-2

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

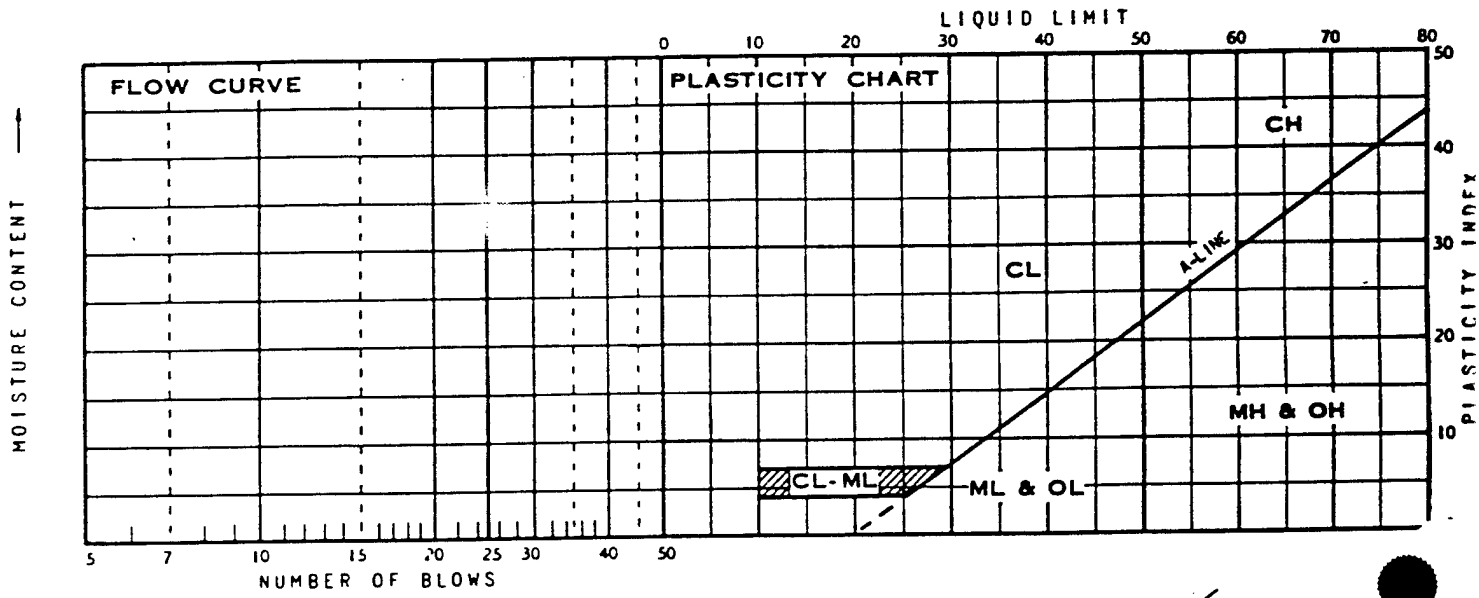
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RH 1/25/94

DETERMINATION	1	2	3	4	5	6
DISH			NON-PLASTIC			
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE			DIFFICULT TO THREAD			
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



SUMMARY

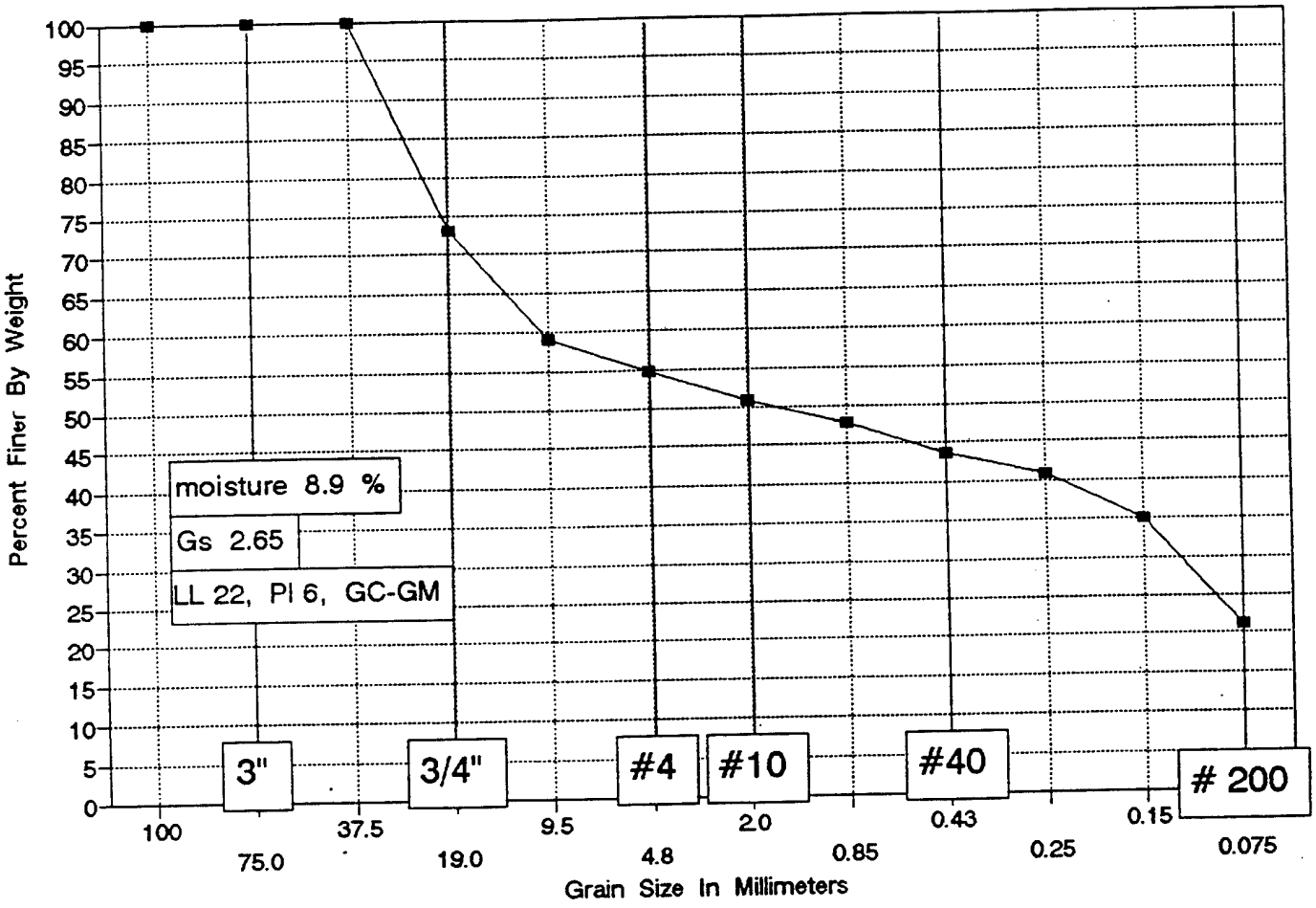
EGH

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SB-34-003A, at 0.0-2.0 ft



Montgomery Watson
TEAD-N Phase II RFI

	totals
Wt soil and dish	100.9
Dry soil & dish	96.2
Dish	43.3
wet soil	411.7
dish	31.6
dry total	349.1

Boring SB-34-003A
Sample at 0-2 feet

Moisture Content = 8.9 %

SIEVE ANALYSIS

Total sample dry = 349.1 g

Weight of sample split #4 39.7 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	93.83	73.12%	73.1	19.0
3/8 inch	143.19	58.98%	59.0	9.5
# 4	157.92	54.76%	54.8	4.8
# 10	2.87	50.80%	50.8	2.0
# 20	5.19	47.60%	47.6	0.85
# 40	8.05	43.66%	43.7	0.43
# 60	9.95	41.04%	41.0	0.25
# 100	14.32	35.01%	35.0	0.15
# 200	24.41	21.09%	21.1	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING GB-34 SAMPLE 003A DEPTH 0-2' BY LAF

JAR ~~DENSITY~~	Total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	411.7
WT. OF ~~RINGS~~ DISH	31.6
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/22 ~~#~~4	1/25 ~~#~~4	
PAN	A-8	GT-24	209	
WT. OF PAN & WET SOIL	100.9	322.4	153.0	
WT. OF PAN & DRY SOIL	96.2	318.9	151.4	
WT. OF MOISTURE				
WT. OF PAN	43.3	109.2	111.7	
WT. OF DRY SOIL				
MOISTURE CONTENT %	8.9			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		93.83			
☐			3/8"		143.19			
☑			#4		157.92			
☐			#10		2.87			
☐			#20		5.19			
☑			#40		8.05			
☐			#60		9.95			
☐			#100		14.32			
☐			#200		24.41			
☐								
☐								

AL only

(19)

NOTE: G_s 2.65

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATOPY CLASSIFICATION _____

CLIENT/OWNER Morrison Knudsen / WEP-OR

LOCATION TEAD-N REF

BORING CB-34 SAMPLE 003A DEPTH 0-2'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

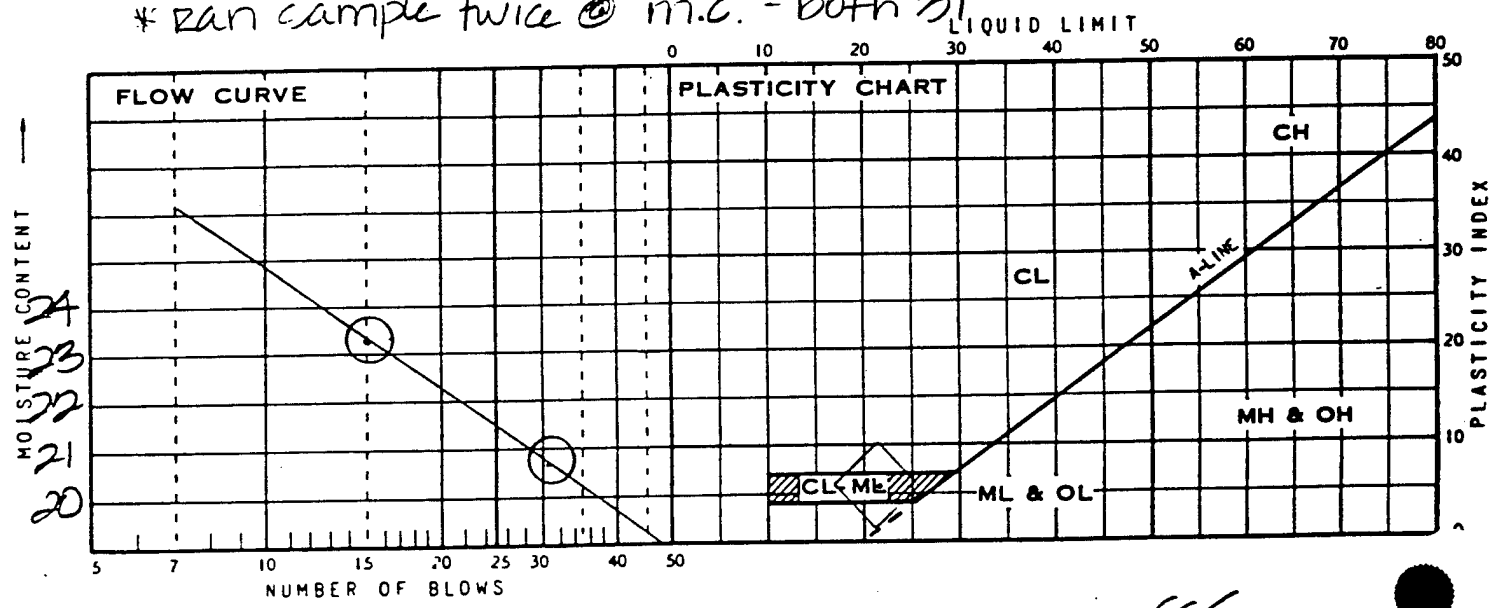
PLASTIC LIMIT BY LAF 2294 (small sample)

DETERMINATION	1	2	3	4	5	6
DISH	AL 126	47				
WT OF DISH + WET SOIL	9.91	8.51				
WT OF DISH + DRY SOIL	8.73	7.49	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	16.10	16.75	AV = 16			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	AL 180	125	AL 92	insufficient sample to get 3 points		
NUMBER OF BLOWS	31 *	15				
WT OF DISH + WET SOIL	9.36	10.04				
WT OF DISH + DRY SOIL	7.99	8.41	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	20.79	23.25				

* Ran sample twice @ m.c. - both 31



SUMMARY

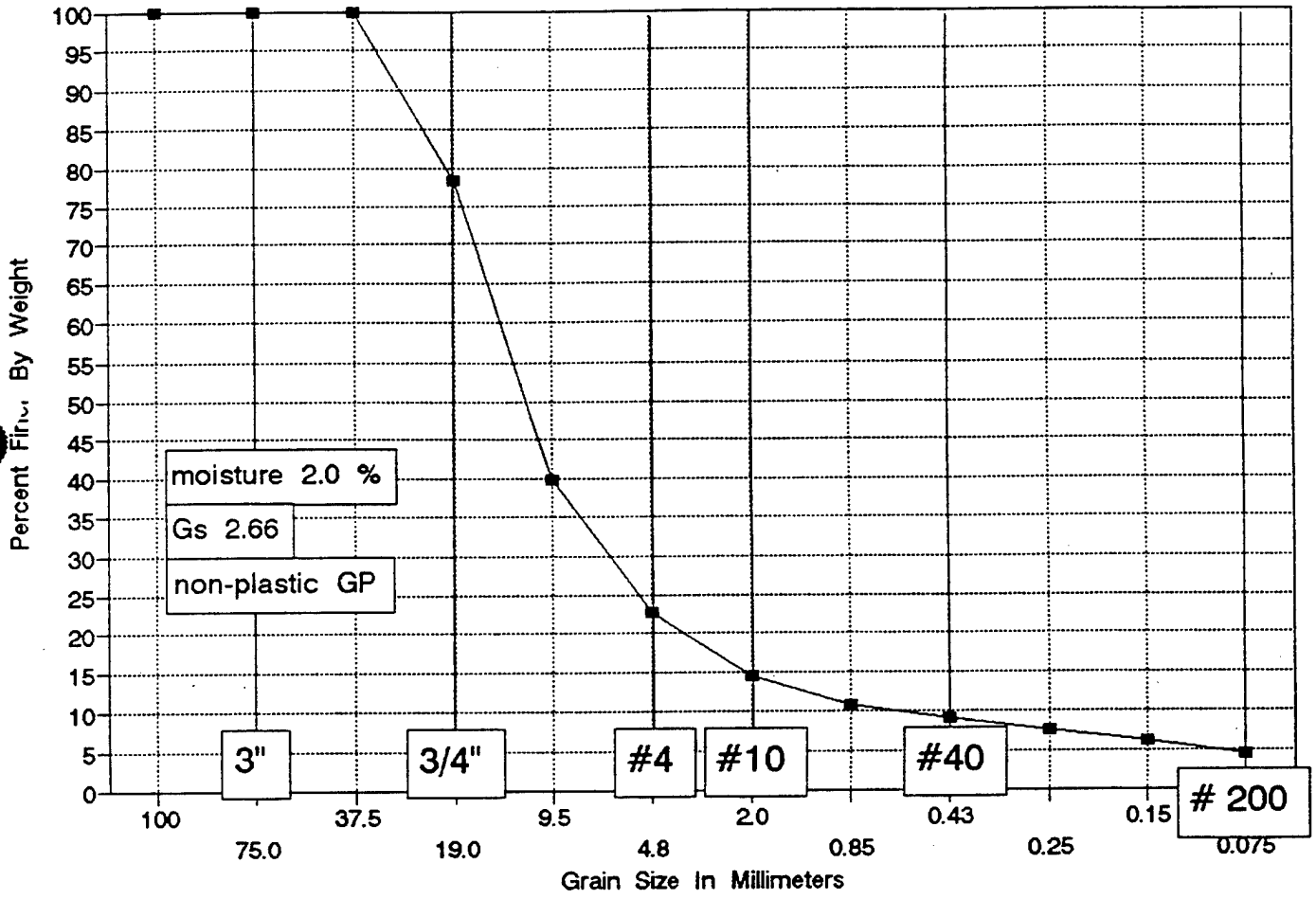
EGT

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		22	16	6	CL-ML	

DAMES & MOORE

GRADATION CURVE

Location SB-34-003E, at 18.0-20.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-34-003E
Sample at 18-20 feet

Moisture Content = 2.0 %

	totals
Wt soil and dish	115.5
Dry soil & dish	114.1
Dish	43.5
wet soil	442.3
dish	52.4
dry total	382.3

SIEVE ANALYSIS

Total sample dry = 382.3 g

Weight of sample split #4 26.3 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	82.78	78.35%	78.3	19.0
3/8 inch	229.83	39.89%	39.9	9.5
# 4	295.73	22.65%	22.6	4.8
# 10	9.44	14.52%	14.5	2.0
# 20	13.74	10.82%	10.8	0.85
# 40	15.86	8.99%	9.0	0.43
# 60	17.53	7.55%	7.6	0.25
# 100	19.29	6.04%	6.0	0.15
# 200	21.28	4.32%	4.3	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING SB-34 SAMPLE 003E DEPTH 18-20' BY LAF

JAR ~~DENSITY~~	Total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	442.3
WT. OF ~~RINGS~~ DISH	52.4
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/22 ①#4	1/25 ②#4	
PAN	A-4	123	202	
WT. OF PAN & WET SOIL	115.5	417.8	137.4	
WT. OF PAN & DRY SOIL	114.1	416.7	137.0	
WT. OF MOISTURE				
WT. OF PAN	43.5	111.4	110.7	
WT. OF DRY SOIL				
MOISTURE CONTENT %	2.0			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		82.78			
☐			3/8"		229.93			
☑			#4		295.73			
☐			#10		9.44			
☐			#20		13.74			
☑			#40		15.86			
☐			#60		17.53			
☐			#100		19.29			
☐			#200		21.28			
☐								
☐								

AL only

(20)

NOTE: G_s 2.66

Dames & Moore

ATTERBERG LIMITS TEST DATA

JOB NO. [illegible]

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER MONTGOMERY WATSON

LOCATION TCHD N EFI

BORING ~~SB-34~~ SAMPLE 0005 DEPTH 18-20'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

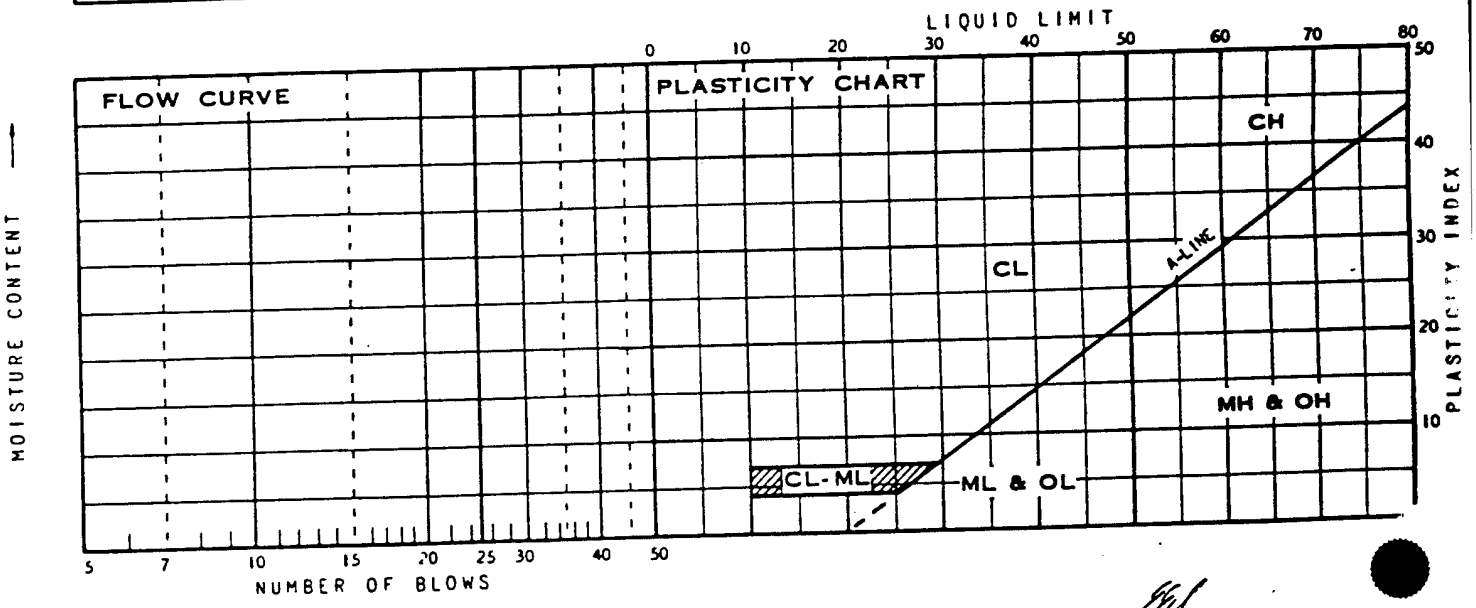
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY EH 1/20/93

DETERMINATION	1	2	3	4	5	6
DISH						
WT OF DISH + WET SOIL				NON PLASTIC		
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	DIFFICULT TO THREAD		
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



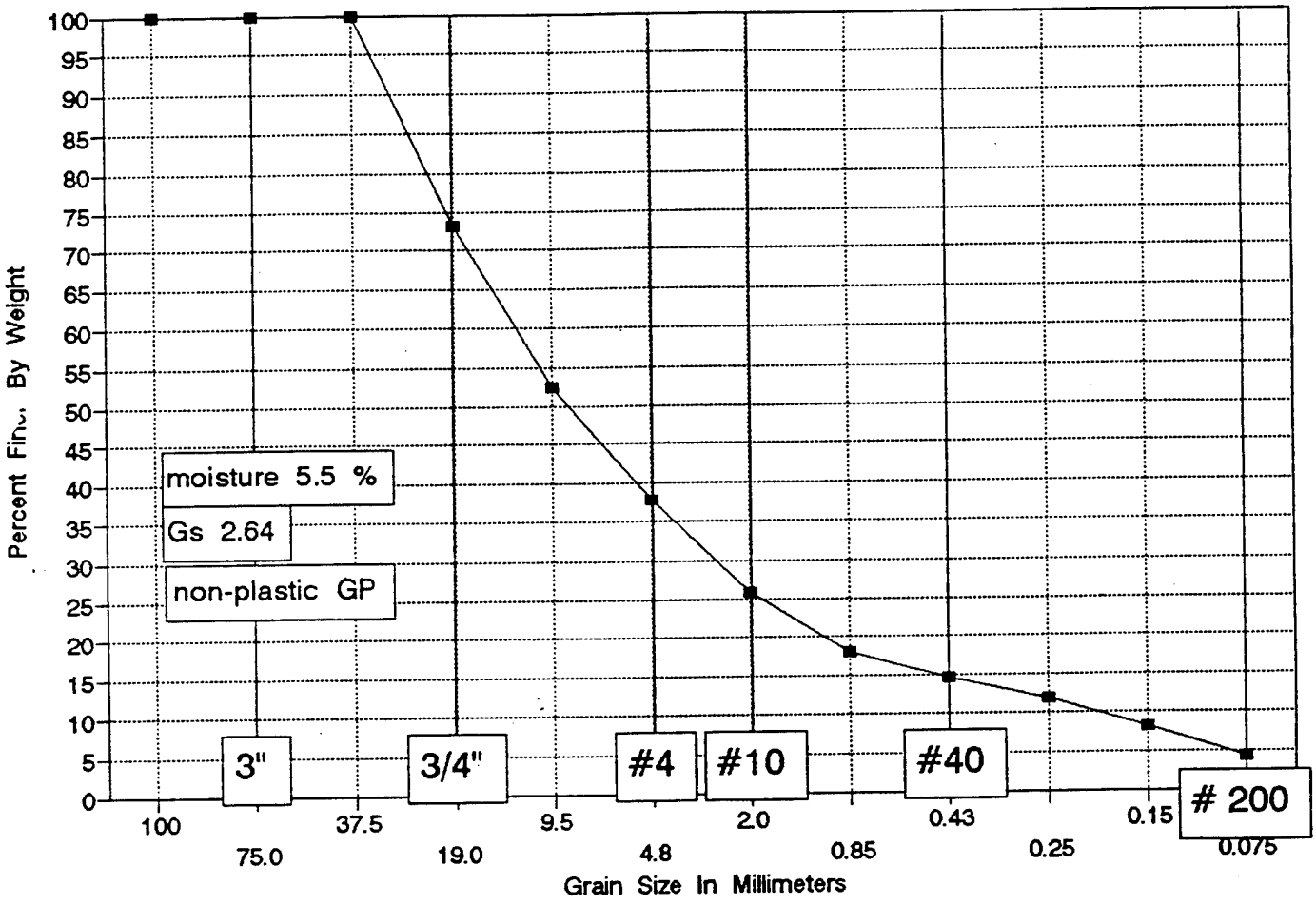
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SB-34-003B, at 4.0-5.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-34-003B
Sample at 4-5 feet

Moisture Content = 5.5 %

	totals
Wt soil and dish	101
Dry soil & dish	98
Dish	43.8
wet soil	441.2
dish	9.4
dry total	409.2

SIEVE ANALYSIS

Total sample dry = 409.2 g

Weight of sample split #4 38.9 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	109.91	73.14%	73.1	19.0
3/8 inch	195.05	52.33%	52.3	9.5
# 4	254.22	37.87%	37.9	4.8
# 10	12.34	25.85%	25.9	2.0
# 20	20.34	18.07%	18.1	0.85
# 40	23.86	14.64%	14.6	0.43
# 60	26.65	11.92%	11.9	0.25
# 100	30.49	8.19%	8.2	0.15
# 200	34.68	4.11%	4.1	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING GB-34 SAMPLE 003B DEPTH 4-5' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	441.2
WT. OF ~~RINGS~~ DISH	9.4
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/22 #4	1/25 #4	
PAN	E-4	302	100	
WT. OF PAN & WET SOIL	101.0	386.0	148.6	
WT. OF PAN & DRY SOIL	98.0	384.4	148.0	
WT. OF MOISTURE				
WT. OF PAN	43.8	113.3	109.1	
WT. OF DRY SOIL				
MOISTURE CONTENT %	5.5			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		109.91			
☐			3/8"		195.05			
☑			#4		254.22			
☐			#10		12.34			
☐			#20		20.34			
☑			#40		23.86			
☐			#60		26.65			
☐			#100		30.49			
☐			#200		34.68			
☐								
☐								

AL only

(21)

NOTE: G_s 2.64

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER [illegible]

LOCATION [illegible]

BORING [illegible] SAMPLE [illegible] DEPTH [illegible]

FIELD DENSITY BY _____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

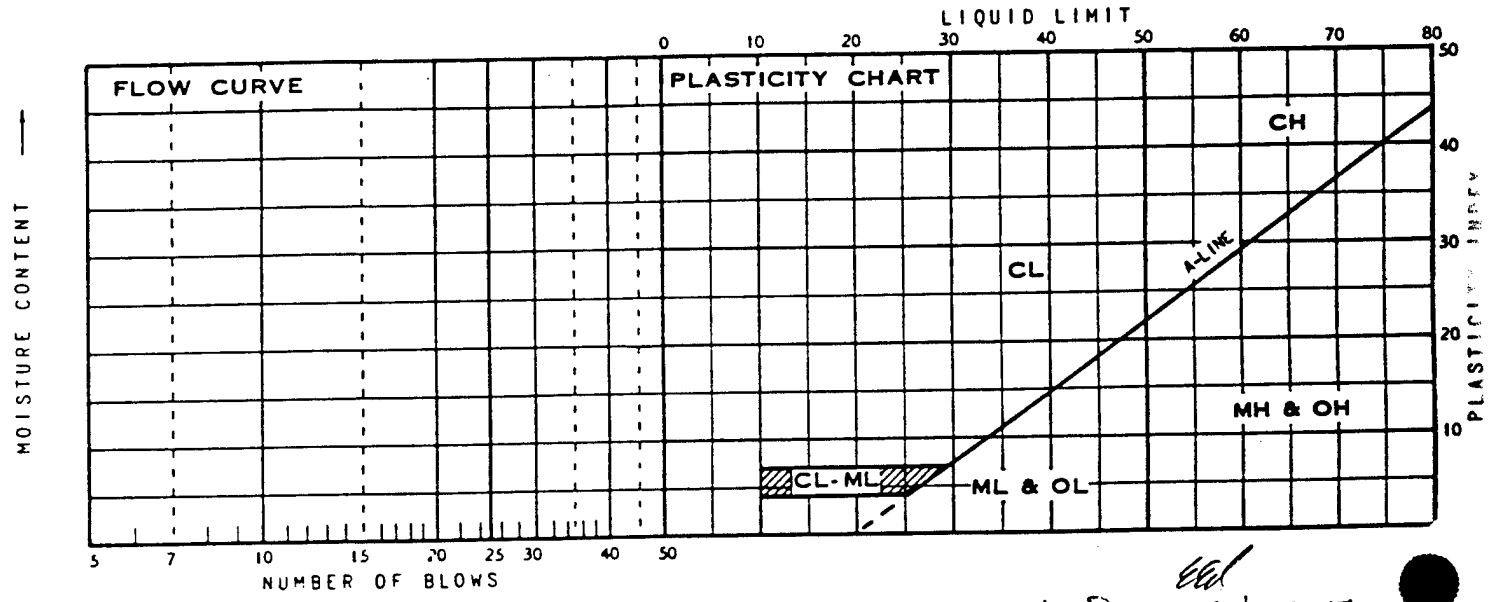
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible]

DETERMINATION	1	2	3	4	5	6
DISH						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



SUMMARY

eal

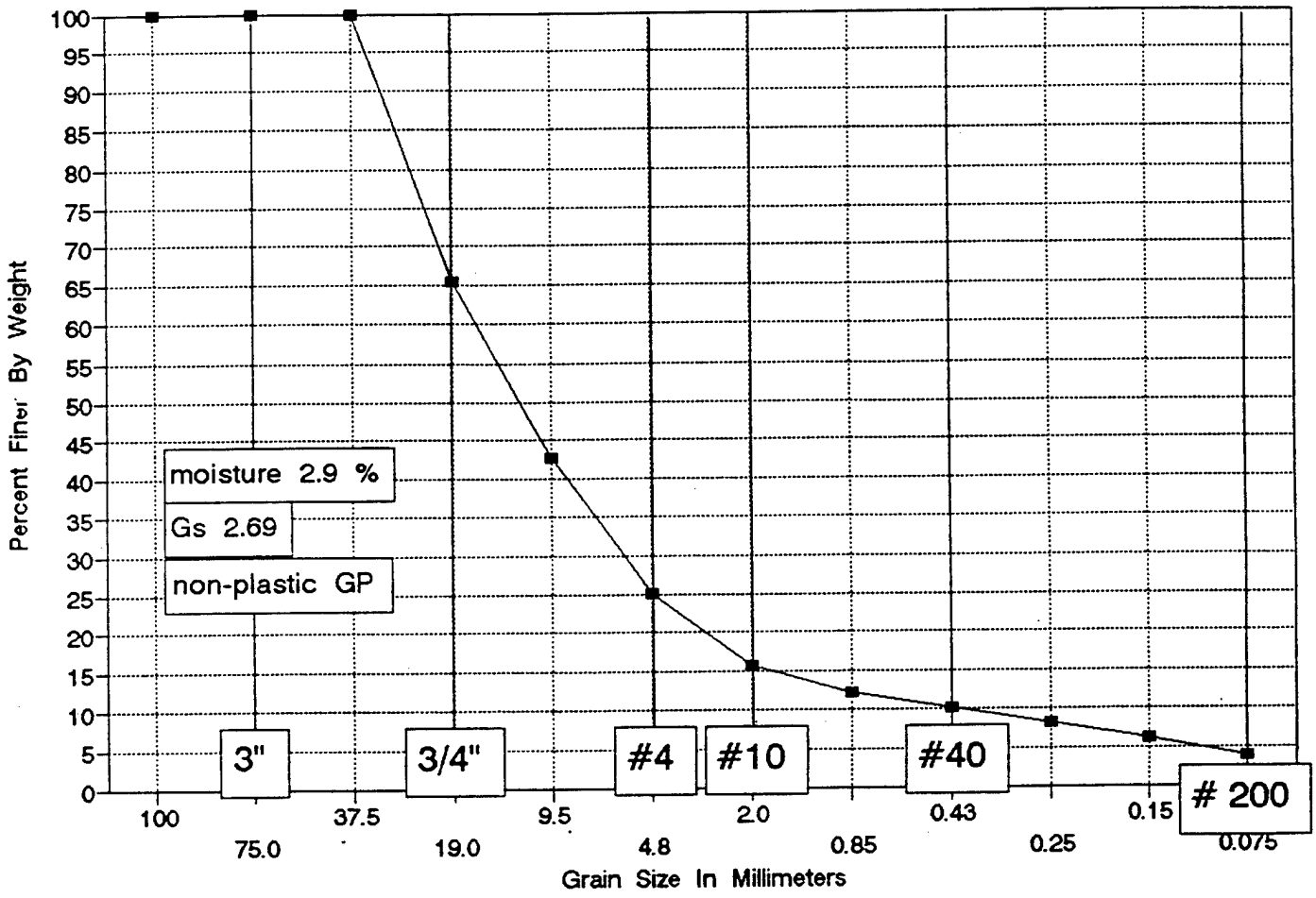
NO PLASTIC LIMIT

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SB-34-002D, at 12.5-15.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-34-002D
Sample at 12.5-15 feet

	totals
Wt soil and dish	100.6
Dry soil & dish	99
Dish	43.5
wet soil	553.7
dish	11.8
dry total	526.7

Moisture Content = 2.9 %

SIEVE ANALYSIS

Total sample dry = 526.7 g

Weight of sample split #4 43.1 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	181.87	65.47%	65.5	19.0
3/8 inch	301.6	42.74%	42.7	9.5
# 4	394.1	25.18%	25.2	4.8
# 10	16.04	15.81%	15.8	2.0
# 20	22.04	12.30%	12.3	0.85
# 40	25.74	10.14%	10.1	0.43
# 60	29.19	8.13%	8.1	0.25
# 100	32.81	6.01%	6.0	0.15
# 200	36.55	3.83%	3.8	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/18/94

BORING GB-34 SAMPLE 002D DEPTH 12.5-15' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	553.7
WT. OF ~~RINGS~~ DISh	11.8
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/21 #4	1/22 #4	
PAN	E10	GT-26	318	
WT. OF PAN & WET SOIL	100.6	516.6	154.0	
WT. OF PAN & DRY SOIL	99.0	515.2	153.5	
WT. OF MOISTURE				
WT. OF PAN	43.5	110.8	110.4	
WT. OF DRY SOIL				
MOISTURE CONTENT %	2.9			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		181.87			
☐			3/8"		301.6			
☑			#4		394.1			
☐			#10		16.04			
☐			#20		22.04			
☑ AL only			#40		25.74			
☐			#60		29.19			
☐			#100		32.81			
☐			#200		36.55			
☐								
☐								

(22)

NOTE: Gs 2.69

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. _____

CLIENT/OWNER MONTGOMERY WATSON

LOCATION TEAD - N RFT

BORING SB 3A SAMPLE 002D DEPTH 12.5-15'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

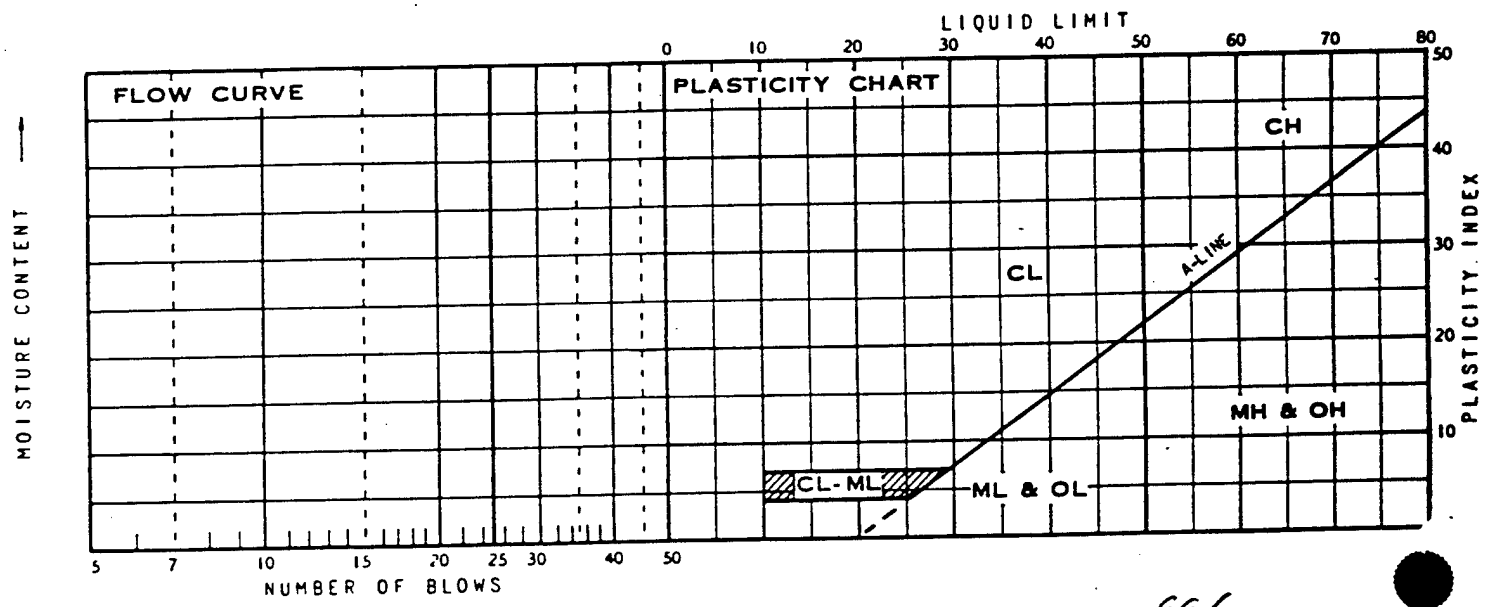
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RH 1.25.94

DETERMINATION	1	2	3	4	5	6
DISH						
WT OF DISH + WET SOIL			NON PLASTIC			
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	DIFFICULT TO THREAD			—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



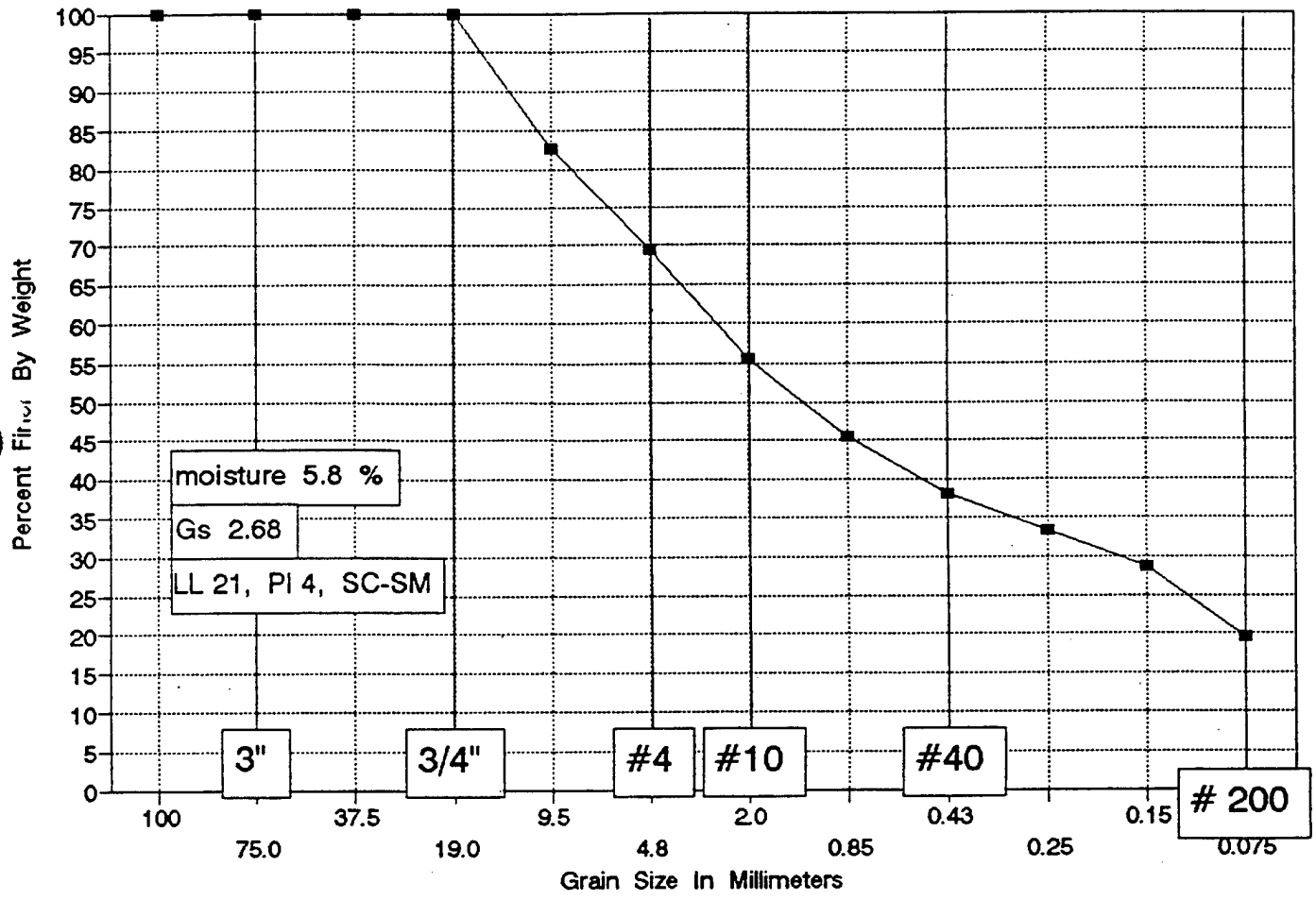
SUMMARY EEL

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SB-BK-010A, at 0.0-1.5 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-BK-010A
Sample at 0-1.5 feet

	totals
Wt soil and dish	130.1
Dry soil & dish	125.4
Dish	43.9
wet soil	542.3
dish	11.5
dry total	501.9

Moisture Content = 5.8 %

SIEVE ANALYSIS

Total sample dry = 501.9 g

Weight of sample split #4 69.8 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	86.57	82.75%	82.8	9.5
# 4	152.88	69.54%	69.5	4.8
# 10	14.07	55.52%	55.5	2.0
# 20	24.03	45.60%	45.6	0.85
# 40	31.53	38.13%	38.1	0.43
# 60	36.4	33.27%	33.3	0.25
# 100	41.12	28.57%	28.6	0.15
# 200	49.99	19.74%	19.7	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/18/94

BORING SB-BK SAMPLE 010A DEPTH 0.0-1.5' BY LAF

JAR ~~DENSITY~~	Total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	542.3
WT. OF ~~RINGS~~ DISH	11.5
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/21 ⊖#4	1/22 ⊖#4	
PAN	E-4	80	ST-31	
WT. OF PAN & WET SOIL	130.1	317.5	181.4	
WT. OF PAN & DRY SOIL	125.4	315.6	180.5	
WT. OF MOISTURE				
WT. OF PAN	43.9	105.2	110.7	
WT. OF DRY SOIL				
MOISTURE CONTENT %	5.8			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"		0			
☐			3/8"		86.57			
☑			#4		52.83			
☐			#10		14.07			
☐			#20		24.03			
☑			#40		31.53			
☐			#60		36.40			
☐			#100		41.12			
☐			#200		49.99			
☐								
☐								

GL only

(23)

NOTE: Gs 2.68

EE/ Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER MONTGOMERY WATSON

LOCATION EAD-N REI

BORING SB-BK SAMPLE D10A DEPTH 0-1.5'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

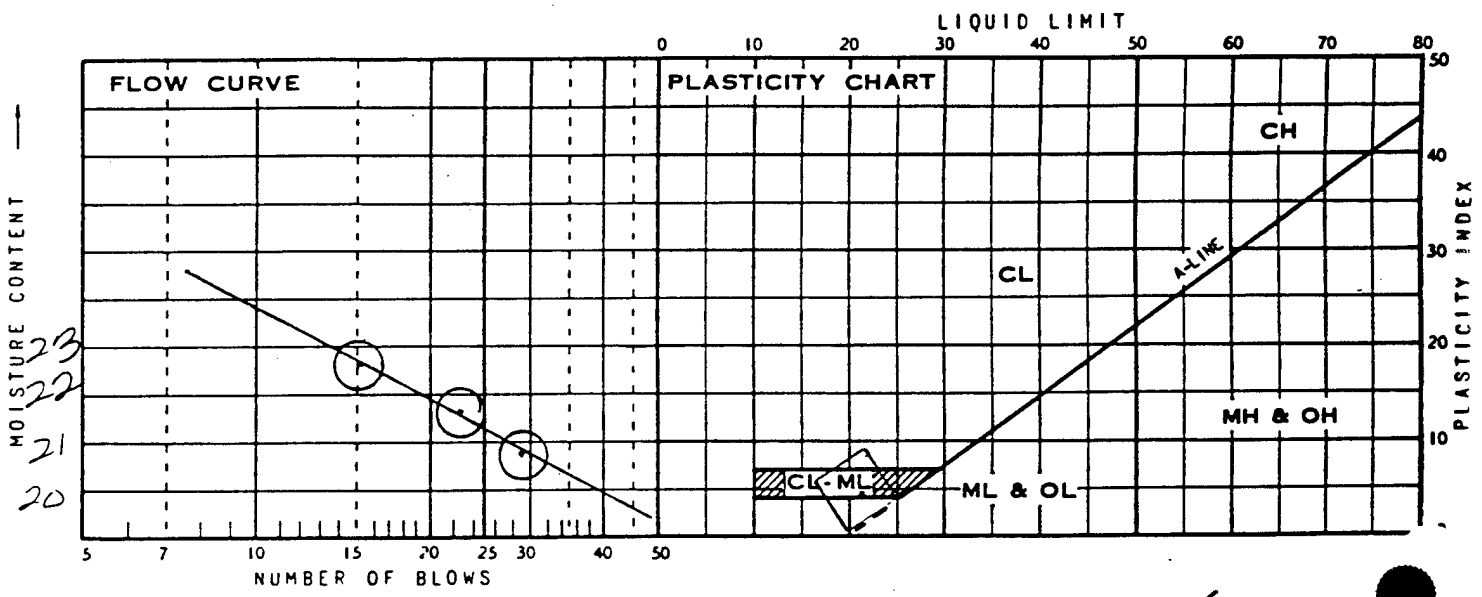
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RH 2594

DETERMINATION	1	2	3	4	5	6
DISH	AL-135	10				
WT OF DISH + WET SOIL	9.59	11.49				
WT OF DISH + DRY SOIL	8.43	10.04	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	16.50	16.78	AV=17			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	AL-110	54	AL-91			
NUMBER OF BLOWS	29	23	15			
WT OF DISH + WET SOIL	13.30	11.21	12.17			
WT OF DISH + DRY SOIL	11.25	9.45	10.17	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	20.81	21.86	22.81			



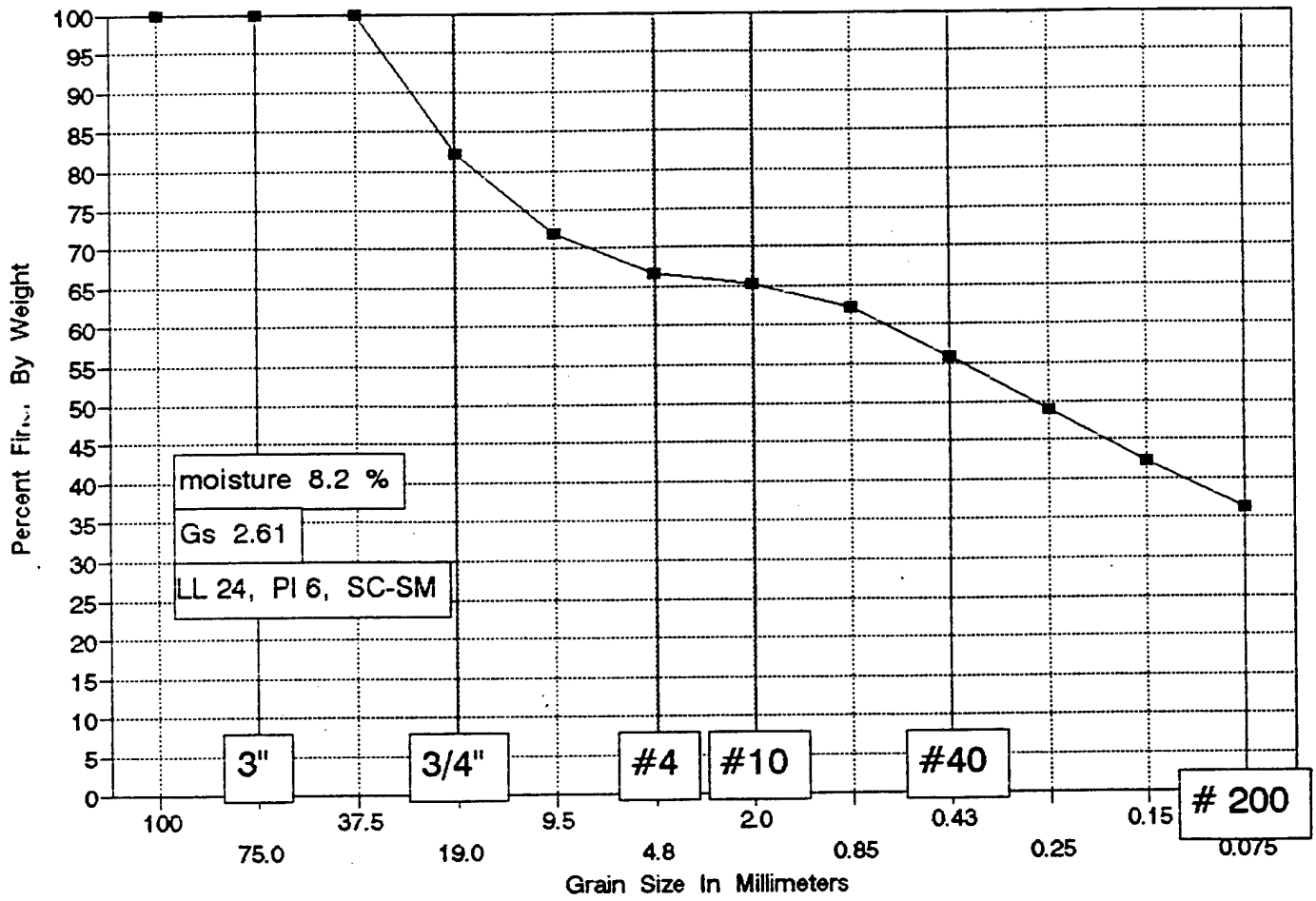
SUMMARY SEL

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		21	17	4	CL-ML	

DAMES & MOORE

GRADATION CURVE

Location SB-20-002A, at 0.0-1.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-20-002A
Sample at 0-1 feet

Moisture Content = 8.2 %

	totals
Wt soil and dish	98.9
Dry soil & dish	94.7
Dish	43.3
wet soil	473.3
dish	36.4
dry total	403.9

SIEVE ANALYSIS

Total sample dry = 403.9 g

Weight of sample split #4 91.1 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	72	82.17%	82.2	19.0
3/8 inch	113.74	71.84%	71.8	9.5
# 4	134.35	66.74%	66.7	4.8
# 10	2.1	65.20%	65.2	2.0
# 20	6.18	62.21%	62.2	0.85
# 40	14.93	55.80%	55.8	0.43
# 60	24.14	49.05%	49.1	0.25
# 100	33.43	42.25%	42.2	0.15
# 200	41.47	36.36%	36.4	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING SB-20 SAMPLE 002A DEPTH 0-1.0' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF RINGS & WET SOIL	473.3
WT. OF RINGS Dish	36.4
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/22 ~~A#4~~	1/25 ~~A#4~~	
PAN	EB	207	ST-30	
WT. OF PAN & WET SOIL	98.9	284.0	703.1	
WT. OF PAN & DRY SOIL	94.7	282.5	200.8	
WT. OF MOISTURE				
WT. OF PAN	43.3	110.9	109.7	
WT. OF DRY SOIL				
MOISTURE CONTENT %	8.2			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		72.00			
☐			3/8"		113.74			
☑			#4		134.35			
☐			#10		2.10			
☐			#20		6.18			
☑ AL only			#40		14.93			
☐			#60		24.14			
☐			#100		33.43			
☐			#200		41.47			
☐								
☐								

(24)

NOTE: G_s 2.61

EG/ Dames & Moore

ATTERBERG LIMITS TEST DATA

JOB NO.:

CLIENT/OWNER Montgomery Watson

FIELD CLASSIFICATION

LOCATION LEAD-N REI

LABORATORY CLASSIFICATION

BORING GB-20 SAMPLE 002A DEPTH 0-1'

FIELD DENSITY BY

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

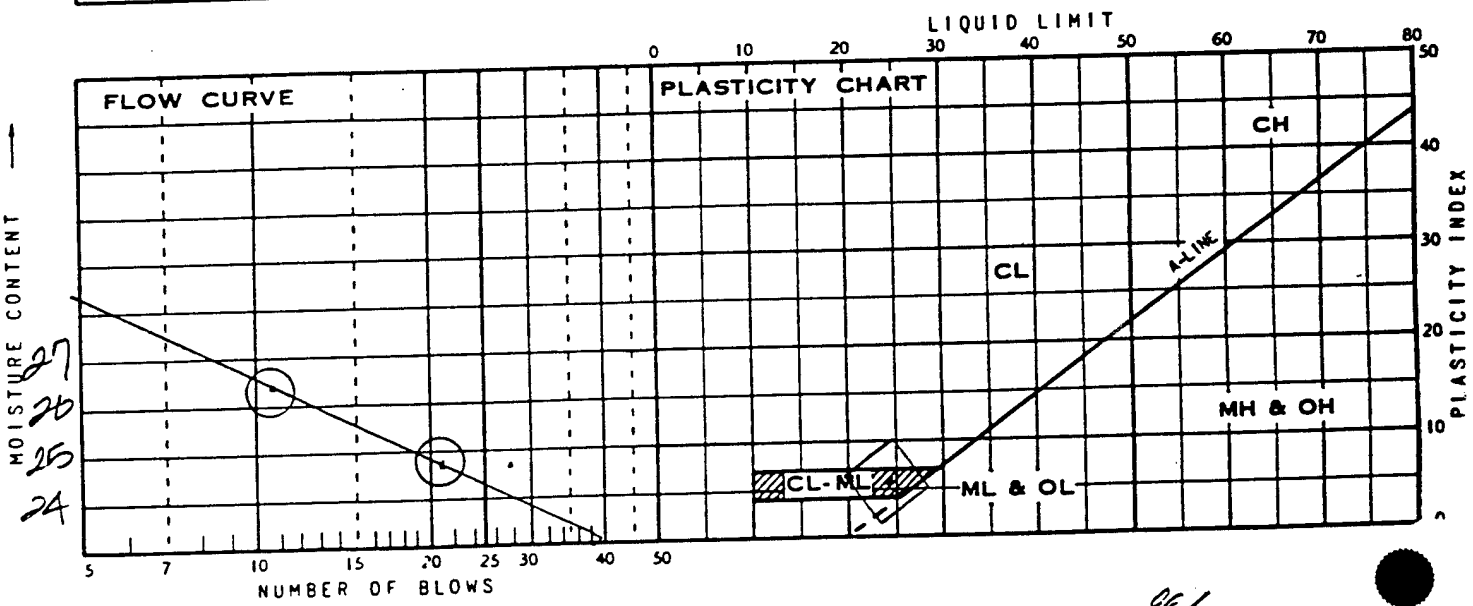
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY ~~LaF 2294~~

DETERMINATION	1	2	3	4	5	6
DISH	6	33				
WT OF DISH + WET SOIL	13.30	11.73				
WT OF DISH + DRY SOIL	11.49	10.19	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	17.94	17.52	AV=18			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	AL 79	AL 93	133			
NUMBER OF BLOWS	28	21	11			
WT OF DISH + WET SOIL	12.44	11.33	10.63			
WT OF DISH + DRY SOIL	10.25	9.40	8.70	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	24.75	24.75	26.44			



SUMMARY

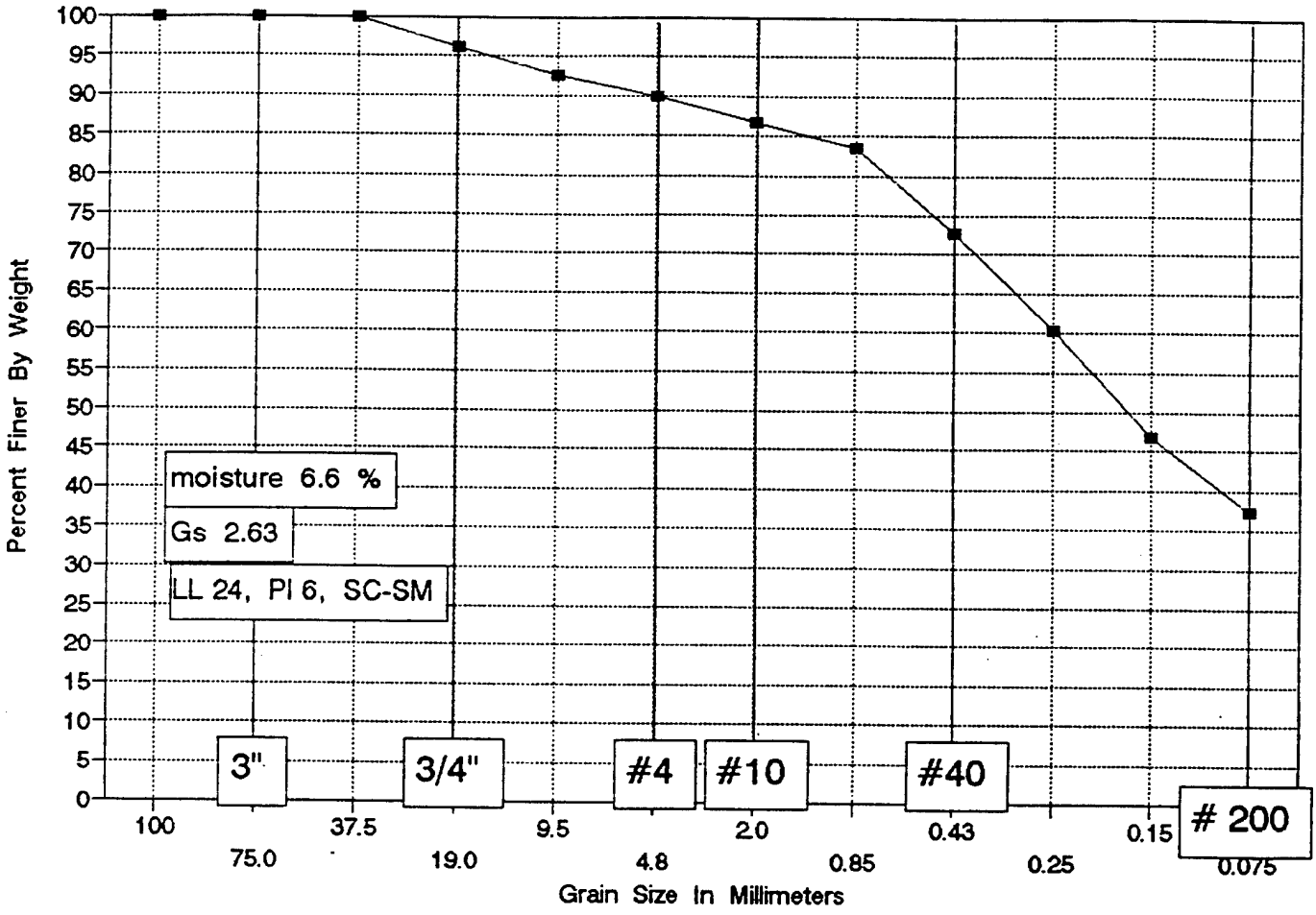
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DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		24	18	6	CL-ML	

DAMES & MOORE

GRADATION CURVE

Location SB-20-006A, at 0.0-1.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-20-006A
Sample at 0-1 feet

	totals
Wt soil and dish	104.1
Dry soil & dish	100.3
Dish	42.8
wet soil	420.2
dish	36.6
dry total	359.8

Moisture Content = 6.6 %

SIEVE ANALYSIS

Total sample dry = 359.8 g

Weight of sample split #4 78.5 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	13.72	96.19%	96.2	19.0
3/8 inch	26.81	92.55%	92.5	9.5
# 4	35.81	90.05%	90.0	4.8
# 10	2.89	86.73%	86.7	2.0
# 20	5.72	83.49%	83.5	0.85
# 40	15.16	72.66%	72.7	0.43
# 60	25.84	60.41%	60.4	0.25
# 100	37.71	46.79%	46.8	0.15
# 200	45.89	37.41%	37.4	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING GB-20 SAMPLE 006A DEPTH 0-1.0' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	420.2
WT. OF ~~RINGS~~ DISh	36.6
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/22 Ⓐ #4	1/25 Ⓐ #4	
PAN	E11	312	308	
WT. OF PAN & WET SOIL	104.1	162.2	199.7	
WT. OF PAN & DRY SOIL	100.3	161.8	187.5	
WT. OF MOISTURE				
WT. OF PAN	42.9	112.3	109.0	
WT. OF DRY SOIL				
MOISTURE CONTENT %	6.6			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		13.72			
☐			3/8"		26.81			
☑			#4		35.81			
☐			#10		2.89			
☐			#20		5.72			
☑			#40		15.16			
☐			#60		25.84			
☐			#100		37.71			
☐			#200		45.89			
☐								
☐								

AL only

(25)

NOTE: $G_s = 2.63$

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER MONTGOMERY/WESTCOR

LOCATION TEAM-IJ REF

BORING SB-20 SAMPLE 0004 DEPTH 0'-__

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

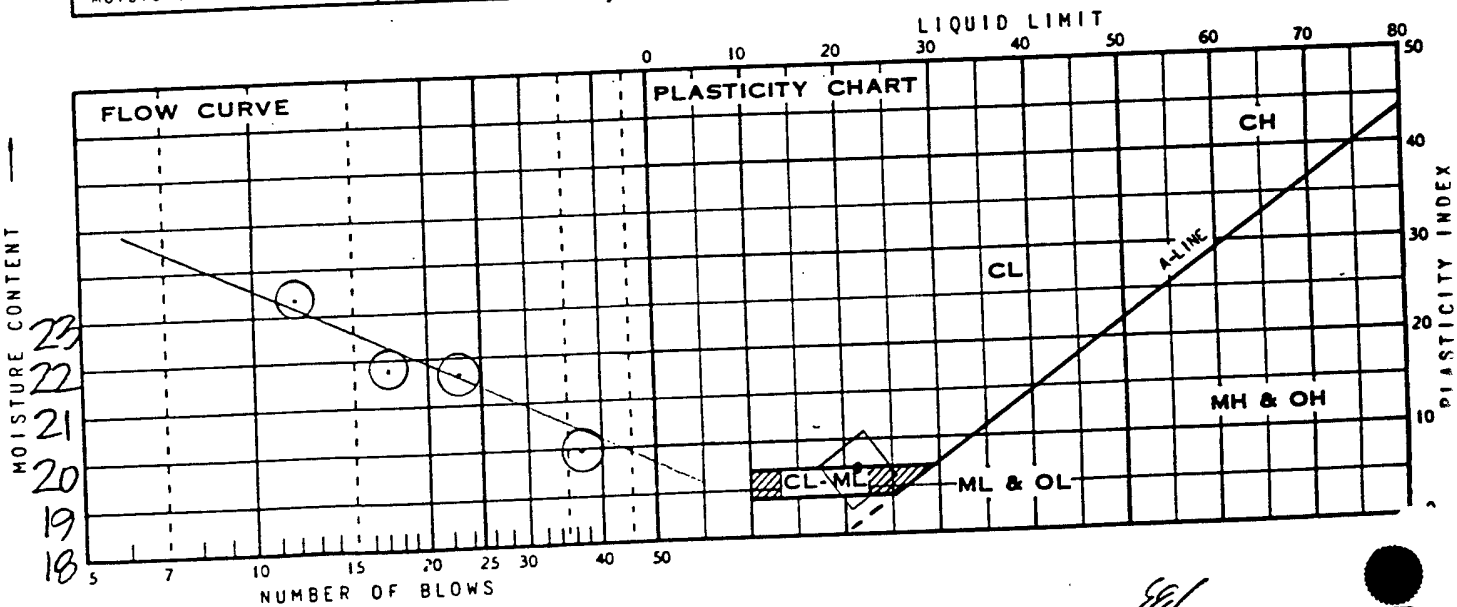
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY PC 1-28-94

DETERMINATION	1	2	3	4	5	6
DISH	75	6				
WT OF DISH + WET SOIL	11.79	11.08				
WT OF DISH + DRY SOIL	10.54	9.92	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.39	1.39	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	13.57	13.62	$\bar{x}$ = 14			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH		15	115	12C	37	
NUMBER OF BLOWS		37	23	17	12	
WT OF DISH + WET SOIL		14.92	14.46	14.53	19.54	
WT OF DISH + DRY SOIL	—	12.67	12.13	12.18	16.11	—
WT OF MOISTURE						
WT OF DISH	—	1.40	1.40	1.40	1.40	—
WT OF DRY SOIL						
MOISTURE CONTENT		19.96	21.71	21.80	23.32	



SUMMARY

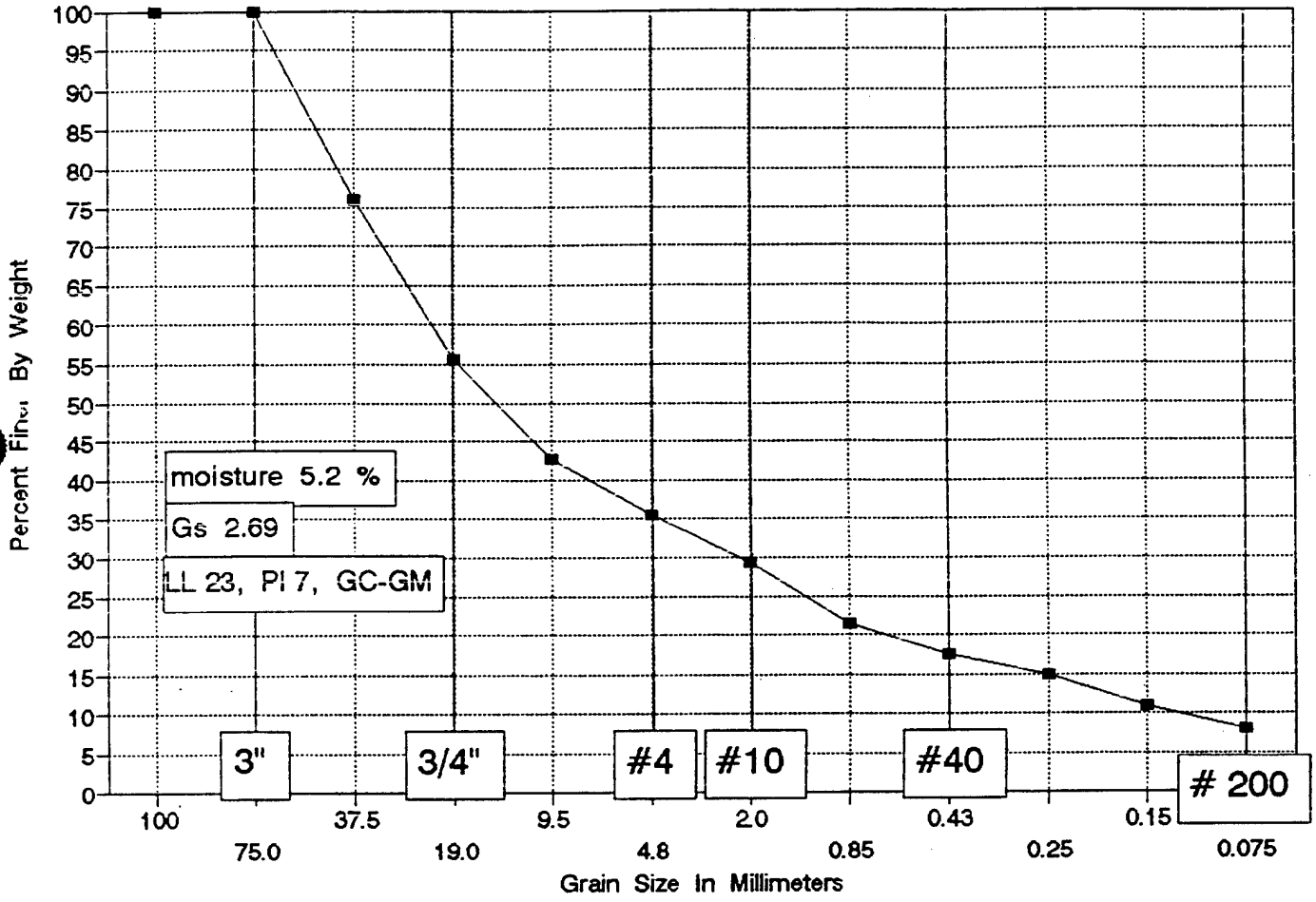
DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		21	14	7	CL-ML	

EGL

DAMES & MOORE

GRADATION CURVE

Location SB-20-001B, at 1.0-2.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-20-001B
Sample at 1-2 feet

Moisture Content = 5.2 %

	totals
Wt soil and dish	110.1
Dry soil & dish	106.8
Dish	43.7
wet soil	556.6
dish	13.5
dry total	516.1

SIEVE ANALYSIS

Total sample dry = 516.1 g

Weight of sample split #4 53.1 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	123.95	75.98%	76.0	37.5
3/4 inch	230.06	55.42%	55.4	19.0
3/8 inch	295.29	42.79%	42.8	9.5
# 4	333.14	35.45%	35.5	4.8
# 10	9.23	29.29%	29.3	2.0
# 20	20.87	21.52%	21.5	0.85
# 40	26.74	17.60%	17.6	0.43
# 60	30.73	14.94%	14.9	0.25
# 100	36.63	11.00%	11.0	0.15
# 200	41.25	7.91%	7.9	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING SB-20 SAMPLE 001B DEPTH 1-2' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	556.6
WT. OF ~~RINGS~~ DKh	135
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/22 A #4	1/25 B #4	
PAN	A-2	GT-29	92	
WT. OF PAN & WET SOIL	110.1	467.8	162.2	
WT. OF PAN & DRY SOIL	106.8	466.9	161.1	
WT. OF MOISTURE				
WT. OF PAN	43.7	109.4	108.0	
WT. OF DRY SOIL				
MOISTURE CONTENT %	5.2			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"		0			
☐			1-1/2"		123.95			
☐			3/4"		230.06			
☐			3/8"		295.29			
☑			#4		333.14			
☐			#10		9.23			
☐			#20		20.87			
☑			#40		26.74			
☐			#60		30.73			
☐			#100		35.63			
☐			#200		41.25			
☐								
☐								

AL only

(26)

NOTE: G_s 2.69

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. _____

CLIENT/OWNER Montgomery Watson

LOCATION TEAD-N REI

BORING SB-20 SAMPLE 001B DEPTH 1-2'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

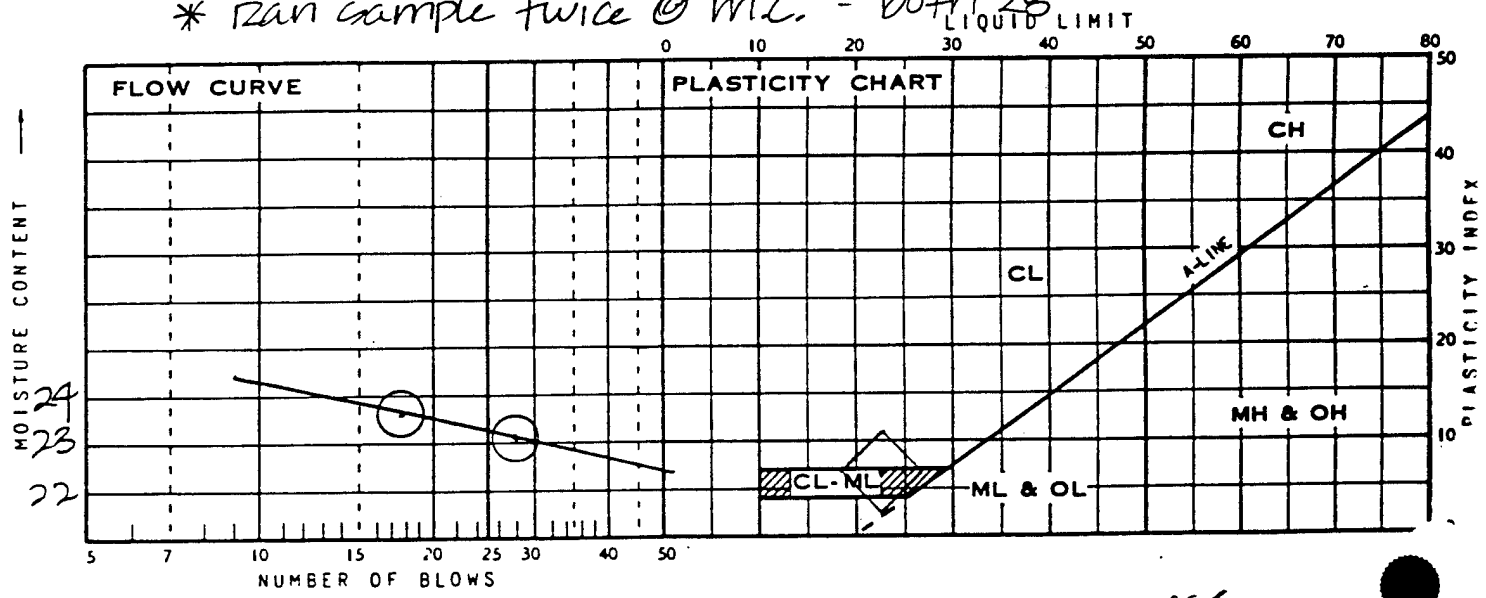
PLASTIC LIMIT BY LEF 2294 (Composite sample)

DETERMINATION	1	2	3	4	5	6
DISH	45	25				
WT OF DISH + WET SOIL	9.69	9.70				
WT OF DISH + DRY SOIL	8.55	7.60	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	15.94	16.016	AV=16			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	AL92	AL97	AL107	insufficient sample to get 3 points		
NUMBER OF BLOWS	28 *	18				
WT OF DISH + WET SOIL	9.26	9.02				
WT OF DISH + DRY SOIL	6.97	6.76	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	23.16	23.51				

* ran sample twice @ M.C. - both 28



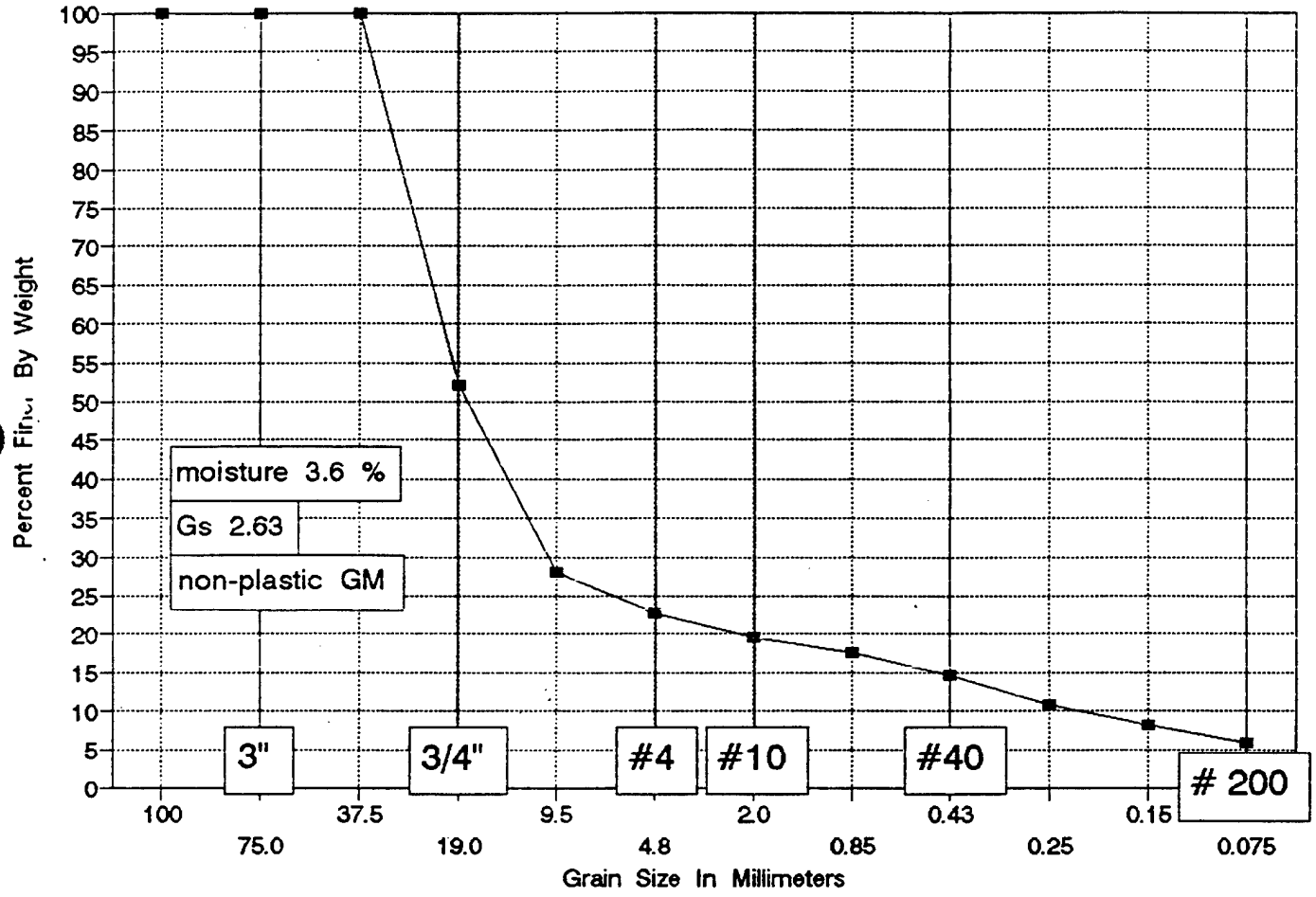
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		23	16	7	CL-ML	

DAMES & MOORE

GRADATION CURVE

Location SB-20-011B, at 1.0-2.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-20-011B
Sample at 1-2 feet

	totals
Wt soil and dish	124.8
Dry soil & dish	122
Dish	43.6
wet soil	606.8
dish	36.4
dry total	550.7

Moisture Content = 3.6 %

SIEVE ANALYSIS

Total sample dry = 550.7 g

Weight of sample split #4 23.5 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	264.04	52.06%	52.1	19.0
3/8 inch	396.06	28.08%	28.1	9.5
# 4	426.01	22.65%	22.6	4.8
# 10	3.08	19.68%	19.7	2.0
# 20	5.29	17.55%	17.5	0.85
# 40	8.24	14.71%	14.7	0.43
# 60	12.31	10.78%	10.8	0.25
# 100	15.15	8.05%	8.0	0.15
# 200	17.34	5.94%	5.9	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6031

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING GB-20 SAMPLE 011B DEPTH 1-2' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	606.9
WT. OF ~~RINGS~~ DCh	364
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/22 #4	1/25 #4	
PAN	L-8	311	GT-25	
WT. OF PAN & WET SOIL	124.8	577.6	133.8	
WT. OF PAN & DRY SOIL	122.0	575.1	133.2	
WT. OF MOISTURE				
WT. OF PAN	43.6	109.1	109.7	
WT. OF DRY SOIL				
MOISTURE CONTENT %	3.6			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		264.04			
☐			3/8"		396.06			
☑			#4		426.01			
☐			#10		3.08			
☐			#20		5.29			
☑			#40		8.24			
☐			#60		12.31			
☐			#100		15.15			
☐			#200		17.34			
☐								
☐								

AL only

(27)

NOTE: G_s 2.63

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATOPY CLASSIFICATION _____

CLIENT/OWNER MONTGOMERY WATSON

LOCATION LEAD-N REF

BORING SB-20 SAMPLE 01B DEPTH 1-2'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

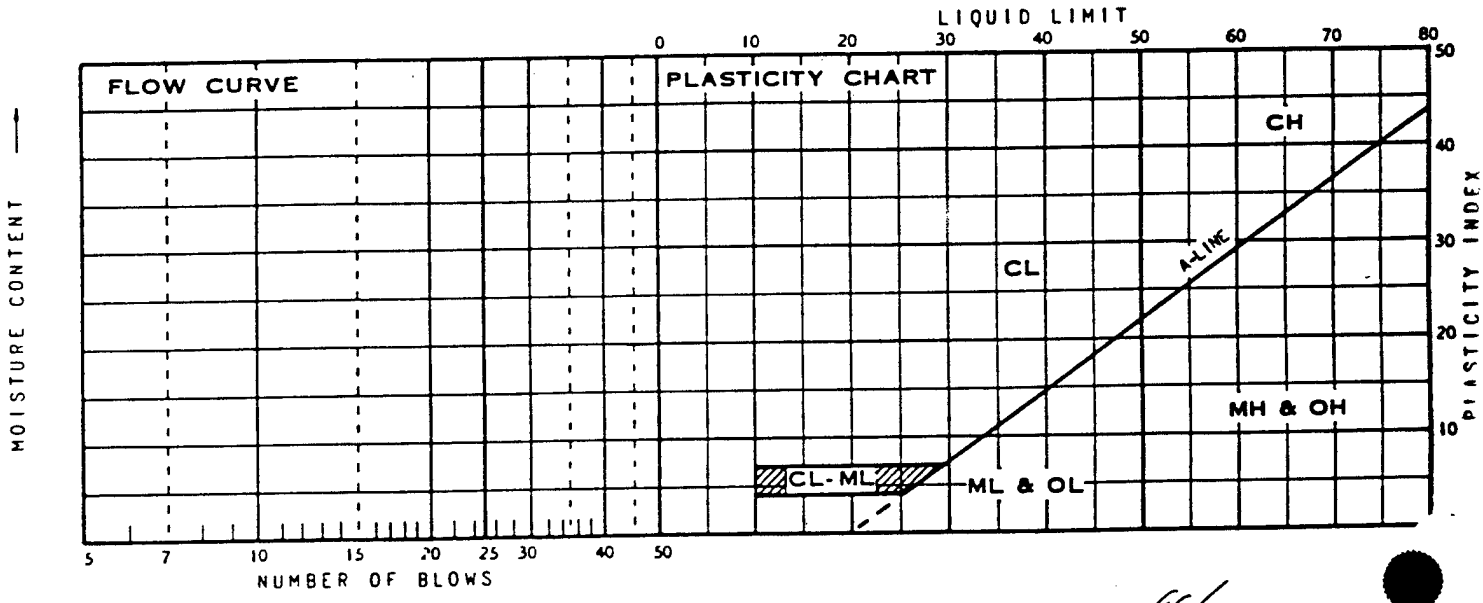
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RH. 1 2724

DETERMINATION	1	2	3	4	5	6
DISH				NON PLASTIC		
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	DIFFICULT TO THREAD		
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



SUMMARY

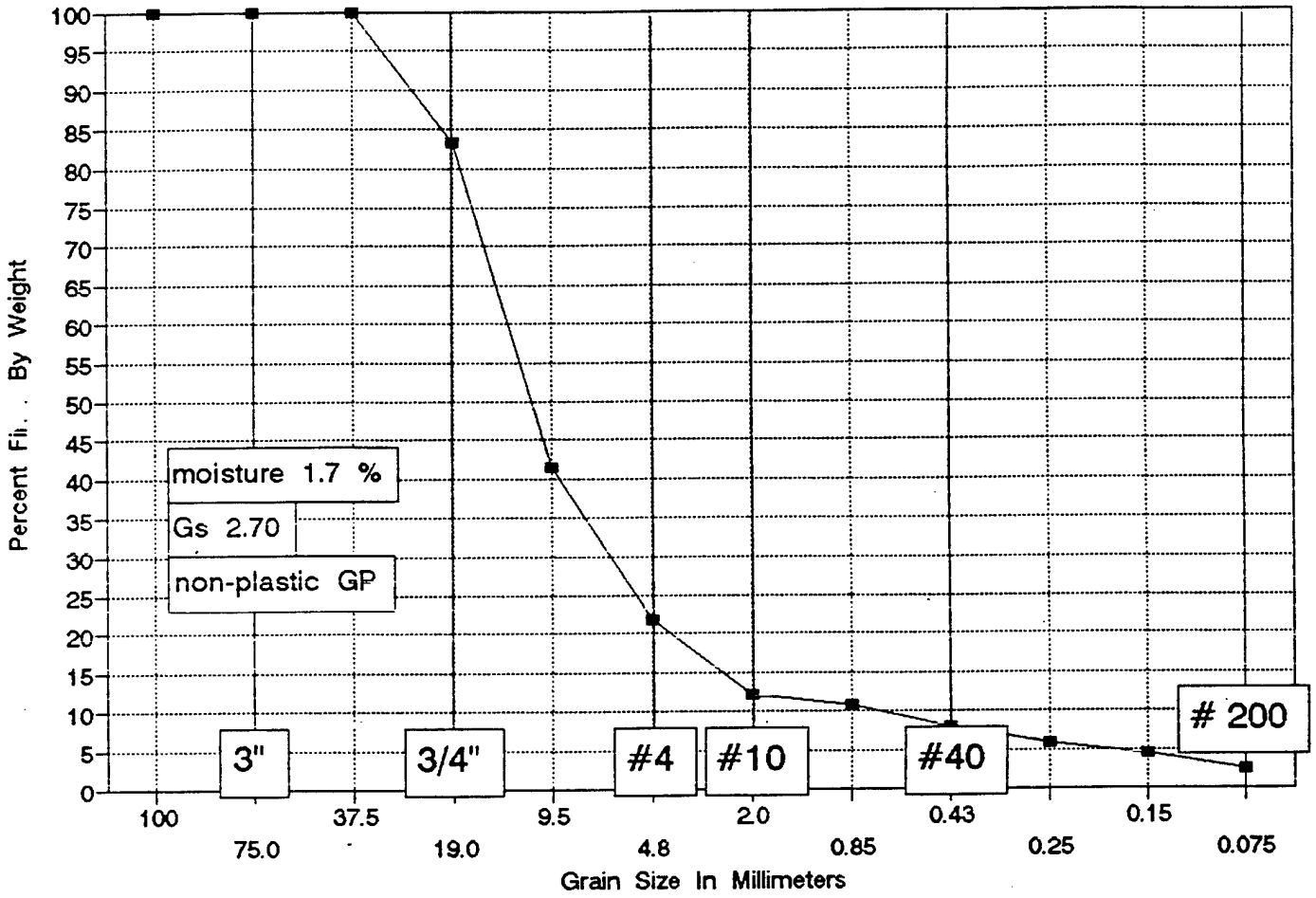
DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

EGL

DAMES & MOORE

GRADATION CURVE

Location SB-20-012C, at 2.0-3.0 ft



Montgomery Watson
TEAD-N Phase II RFI

	totals
Wt soil and dish	126.6
Dry soil & dish	125.2
Dish	43.9
wet soil	555.2
dish	36.4
dry total	510.0

Boring SB-20-012C
Sample at 2-3 feet

Moisture Content = 1.7 %

SIEVE ANALYSIS

Total sample dry = 510.0 g

Weight of sample split #4 30.9 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	85.45	83.25%	83.2	19.0
3/8 inch	297.87	41.60%	41.6	9.5
# 4	398.85	21.80%	21.8	4.8
# 10	13.54	12.25%	12.2	2.0
# 20	15.72	10.71%	10.7	0.85
# 40	19.6	7.97%	8.0	0.43
# 60	22.44	5.97%	6.0	0.25
# 100	24.56	4.47%	4.5	0.15
# 200	27.67	2.28%	2.3	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER /CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING GB-20 SAMPLE 012C DEPTH 2-3' BY LAF

	total WT.
JAR ~~DENSITY~~	
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	555.2
WT. OF ~~RINGS~~ DISh	36.4
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/22 #4	1/25 #4	
PAN	E-3	32	206	
WT. OF PAN & WET SOIL	126.6	524.5	143.6	
WT. OF PAN & DRY SOIL	125.2	523.3	143.0	
WT. OF MOISTURE				
WT. OF PAN	43.9	107.7	112.1	
WT. OF DRY SOIL				
MOISTURE CONTENT %	1.7			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		85.45			
☐			3/8"		297.87			
☑			#4		398.85			
☐			#10		13.54			
☐			#20		15.72			
☑ AL only			#40		19.60			
☐			#60		22.44			
☐			#100		24.56			
☐			#200		27.67			
☐								

(28)

NOTE: G_s 2.70

Dames & Moore

ATTERBERG LIMITS TEST DATA

JOB NO.

CLIENT/OWNER MONTGOMERY WATSON

FIELD CLASSIFICATION _____

LOCATION TEAD-N RPT

LABORATORY CLASSIFICATION _____

BORING SB-20 SAMPLE 012C DEPTH 2-3

FIELD DENSITY BY _____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

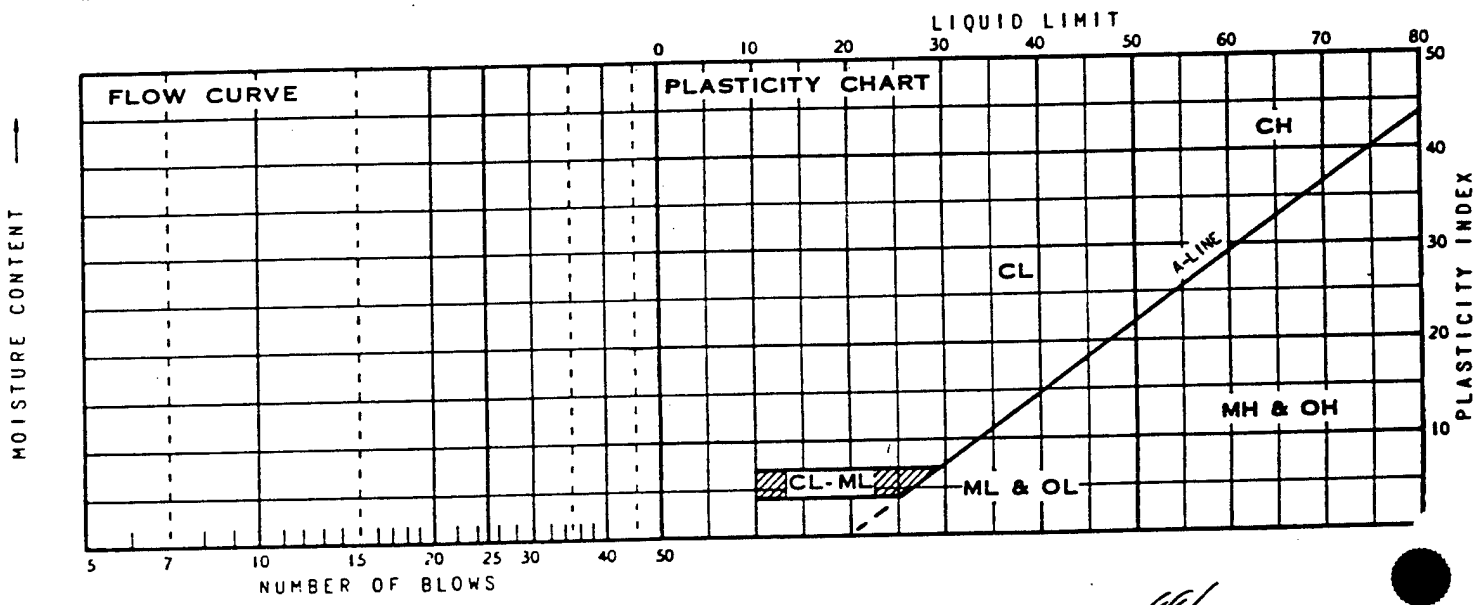
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RH 1 07/94

DETERMINATION	1	2	3	4	5	6
DISH				NON PLASTIC		
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	DIFFICULT TO THREAD		
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



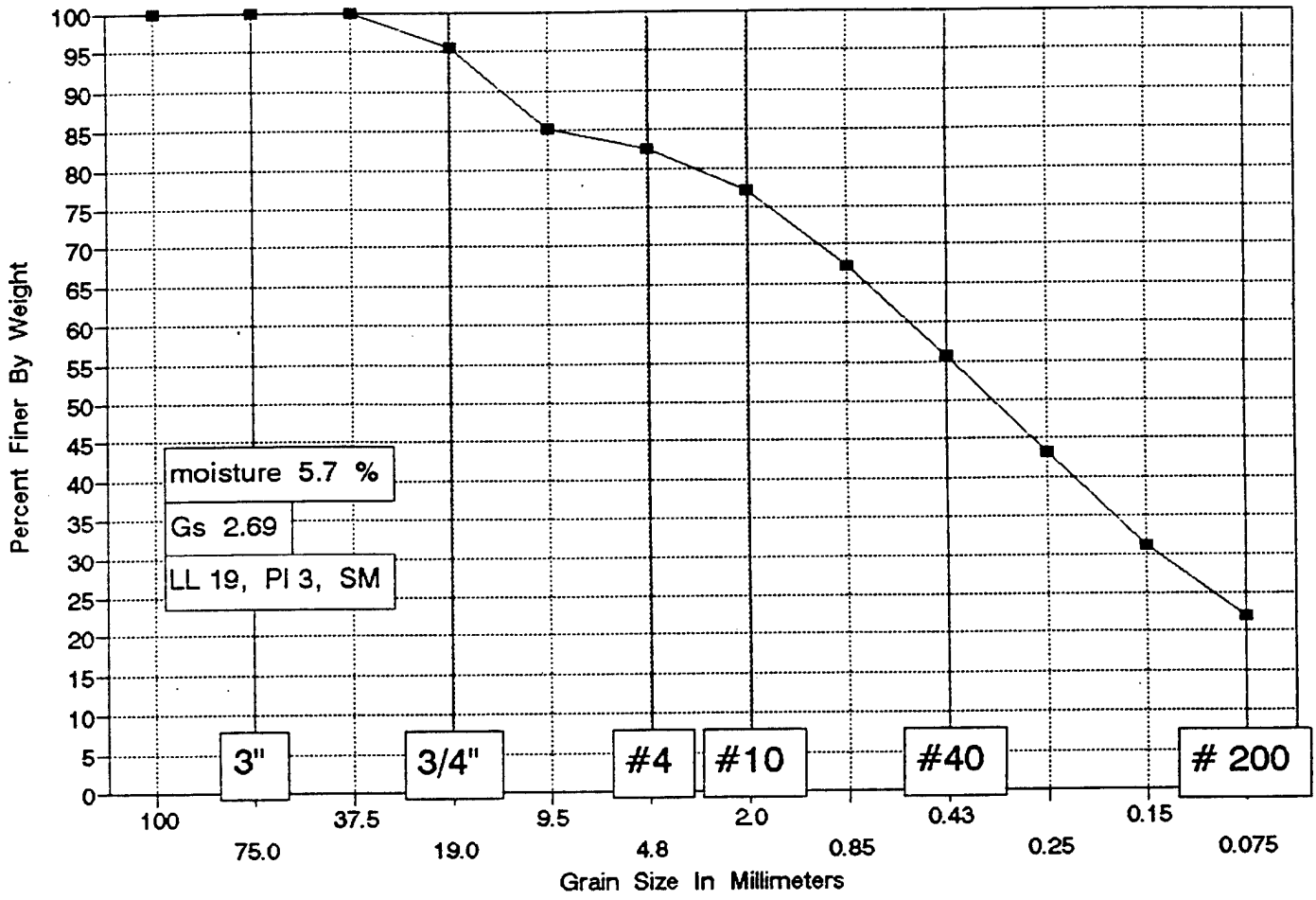
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

DAMES & MOORE

GRADATION CURVE

Location SB-20-016A, at 0.0-1.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-20-016A
Sample at 0-1 feet

	totals
Wt soil and dish	109.1
Dry soil & dish	105.6
Dish	43.8
wet soil	401.9
dish	13.4
dry total	367.7

Moisture Content = 5.7 %

SIEVE ANALYSIS

Total sample dry = 367.7 g

Weight of sample split #4 82.9 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	16.15	95.61%	95.6	19.0
3/8 inch	54.75	85.11%	85.1	9.5
# 4	63.96	82.60%	82.6	4.8
# 10	5.46	77.16%	77.2	2.0
# 20	15.48	67.18%	67.2	0.85
# 40	27.03	55.67%	55.7	0.43
# 60	39.63	43.12%	43.1	0.25
# 100	51.81	30.98%	31.0	0.15
# 200	60.81	22.01%	22.0	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING GB-20 SAMPLE 016A DEPTH 0-1.0' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	401.9
WT. OF ~~RINGS~~ DCh	13.4
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/22 A #4	1/25 O #4	
PAN	L-6	GT-22	GT-27	
WT. OF PAN & WET SOIL	109.1	194.1	192.9	
WT. OF PAN & DRY SOIL	105.6	193.5	191.6	
WT. OF MOISTURE				
WT. OF PAN	43.8	108.4	108.7	
WT. OF DRY SOIL				
MOISTURE CONTENT %	5.7			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		16.15			
☐			3/8"		54.75			
☑			#4		63.96			
☐			#10		5.46			
☐			#20		15.48			
☑			#40		27.03			
☐			#60		39.63			
☐			#100		51.81			
☐			#200		100.81			
☐								
☐								

AL only

(29)

NOTE: 6; 2-69

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Montgomery Watson

LOCATION TEAD-N RFI

BORING GB-20 SAMPLE 016A DEPTH 0-1'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

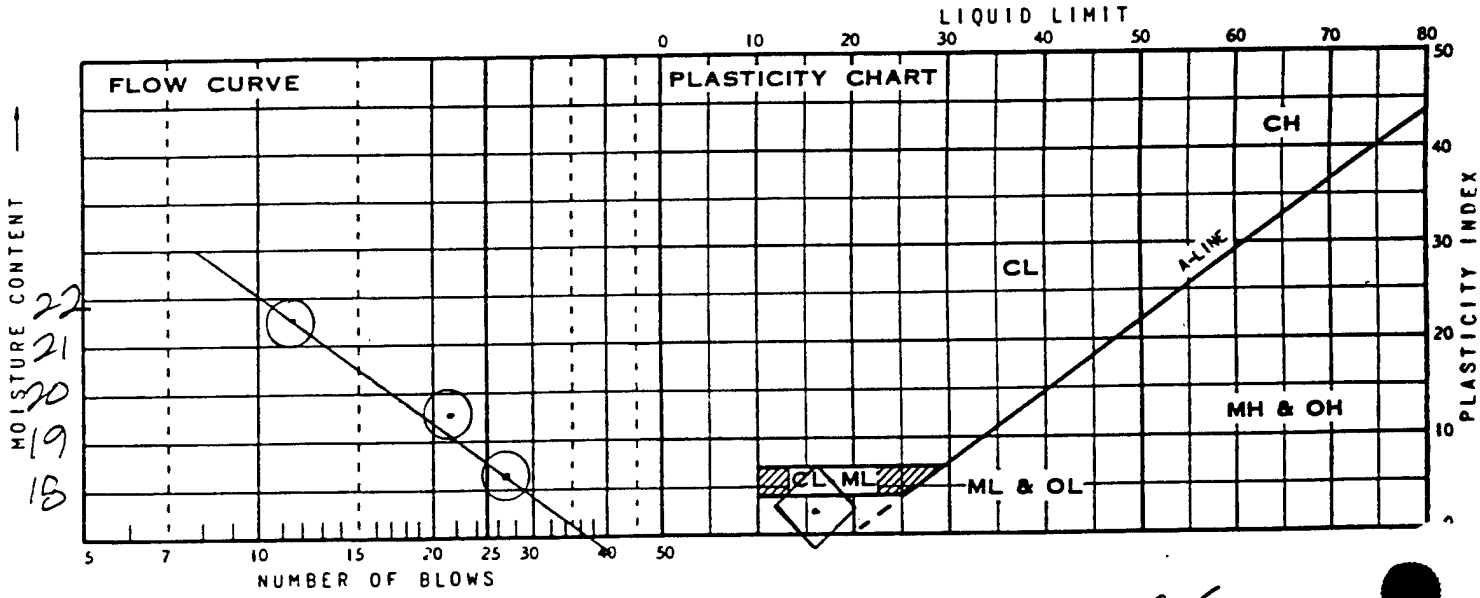
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY LAF 2294

DETERMINATION	1	2	3	4	5	6
DISH	116	20				
WT OF DISH + WET SOIL	10.82	14.14				
WT OF DISH + DRY SOIL	9.54	12.35	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	15.72	16.35	AV = 16			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	A-8	110	134			
NUMBER OF BLOWS	27	22	12			
WT OF DISH + WET SOIL	10.46	10.64	11.10			
WT OF DISH + DRY SOIL	9.06	9.13	9.38	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	18.28	19.53	21.55			



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		19	16	3	CL-ML	

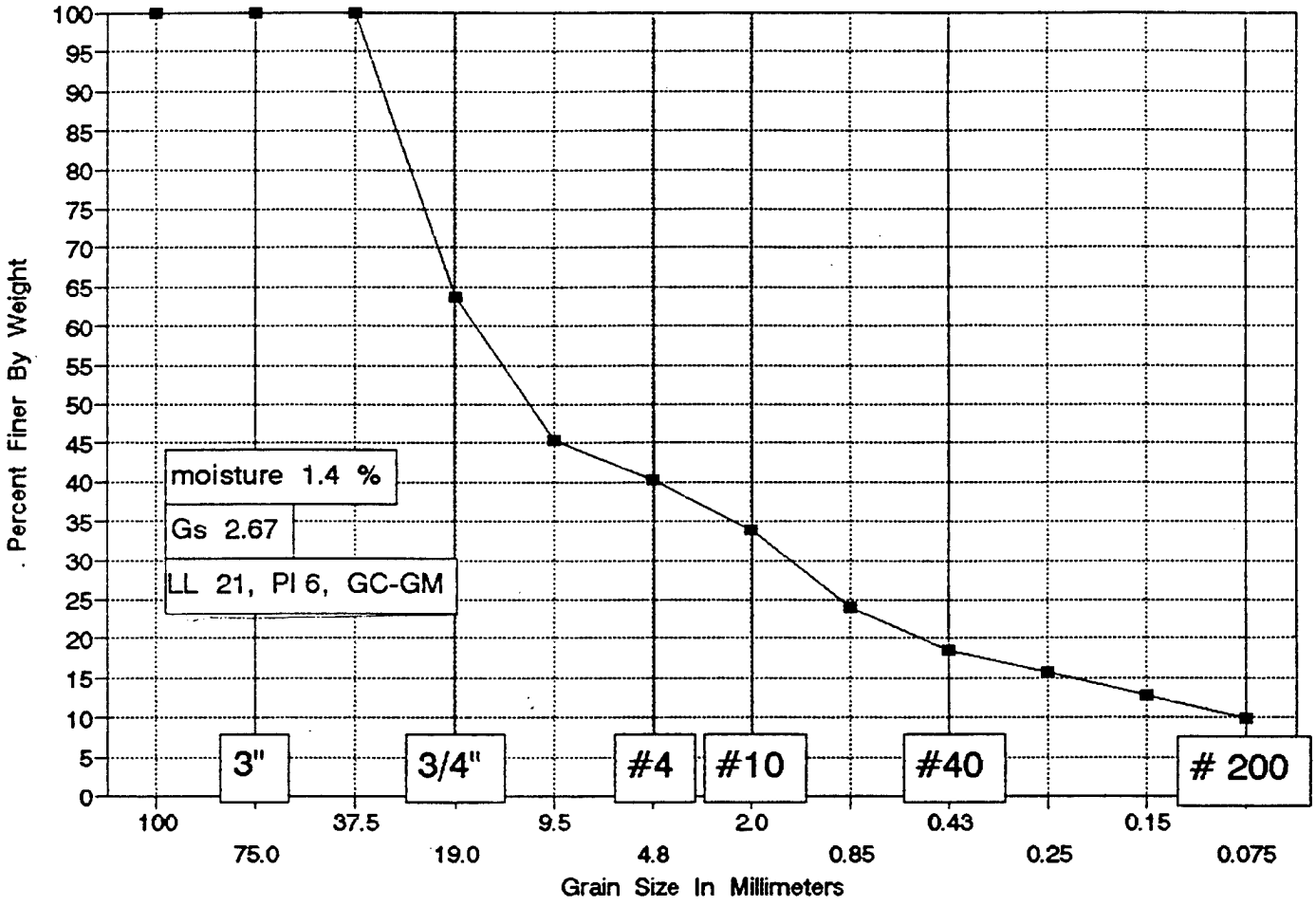
EGL

ML

DAMES & MOORE

GRADATION CURVE

Location SB-20-018C, at 2.0-3.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-20-018C
Sample at 2-3 feet

	totals
Wt soil and dish	107.9
Dry soil & dish	107
Dish	43.6
wet soil	603.3
dish	112.7
dry total	483.7

Moisture Content = 1.4 %

SIEVE ANALYSIS

Total sample dry = 483.7 g

Weight of sample split #4 48.8 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	175.41	63.74%	63.7	19.0
3/8 inch	263.54	45.52%	45.5	9.5
# 4	289.67	40.12%	40.1	4.8
# 10	7.67	33.81%	33.8	2.0
# 20	19.66	23.96%	24.0	0.85
# 40	26.12	18.64%	18.6	0.43
# 60	29.63	15.76%	15.8	0.25
# 100	33.31	12.73%	12.7	0.15
# 200	36.92	9.77%	9.8	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING SB-20 SAMPLE 0180 DEPTH 2-3' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	603.3
WT. OF ~~RINGS~~ DKh	112.7
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/22 ~~D~~#4	1/25 ~~D~~#4	
PAN	L-10	315	ST-28	
WT. OF PAN & WET SOIL	107.9	408.1	158.6	
WT. OF PAN & DRY SOIL	107.0	407.3	158.0	
WT. OF MOISTURE				
WT. OF PAN	43.6	110.5	109.2	
WT. OF DRY SOIL				
MOISTURE CONTENT %	1.4			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		~~0~~			
☐			3/4"		175.41			
☐			3/8"		263.54			
☑			#4		289.67			
☐			#10		7.67			
☐			#20		19.66			
☑			#40		26.12			
☐			#60		29.63			
☐			#100		33.31			
☐			#200		36.92			
☐								
☐								

AL only

(30)

NOTE: 6s 2.67

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER [illegible]

LOCATION TEAD-N-[illegible]

BORING SB-NO SAMPLE 218C DEPTH 2-3'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

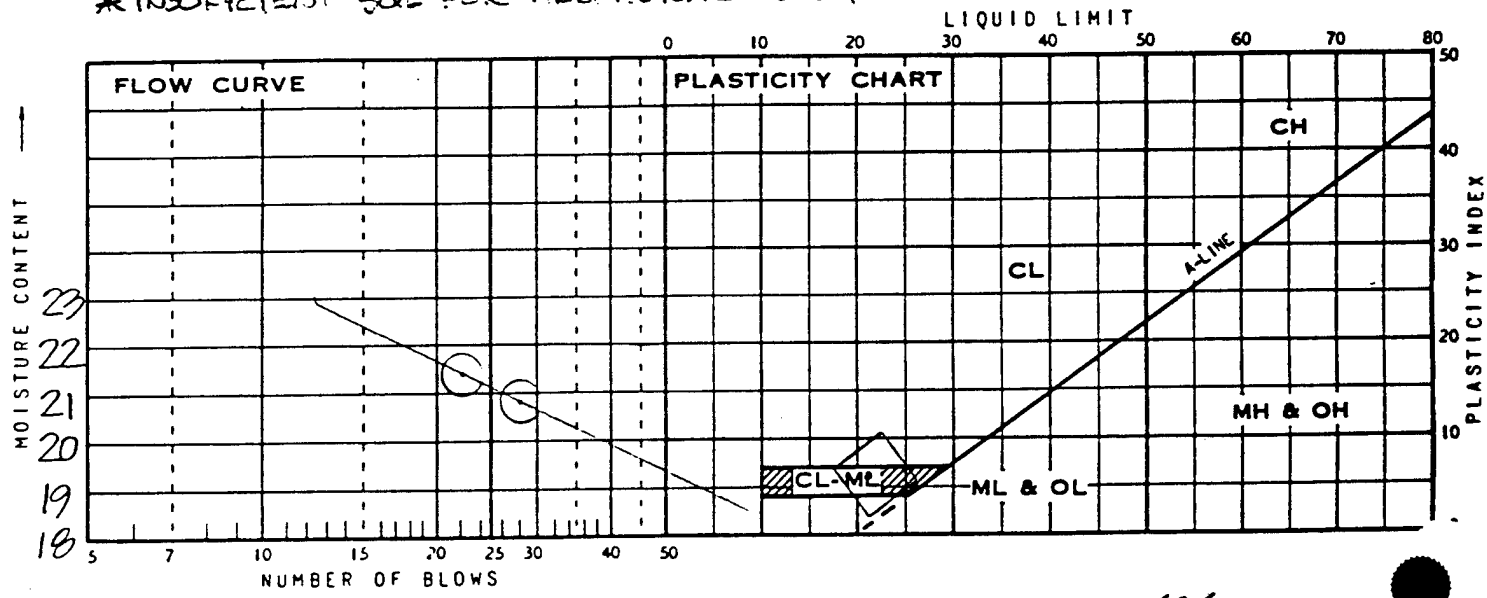
PLASTIC LIMIT BY BC 1/28/83

DETERMINATION	1	2	3	4	5	6
DISH	42	151				
WT OF DISH + WET SOIL	14.49	13.97				
WT OF DISH + DRY SOIL	12.79	12.37	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	14.93	14.59	$\bar{X}$ = 15			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	34	79	*			
NUMBER OF BLOWS	29	22				
WT OF DISH + WET SOIL	12.46	12.37				
WT OF DISH + DRY SOIL	10.55	10.44	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.41	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	20.87	21.35				

* INSUFFICIENT SOIL FOR ADDITIONAL POINT



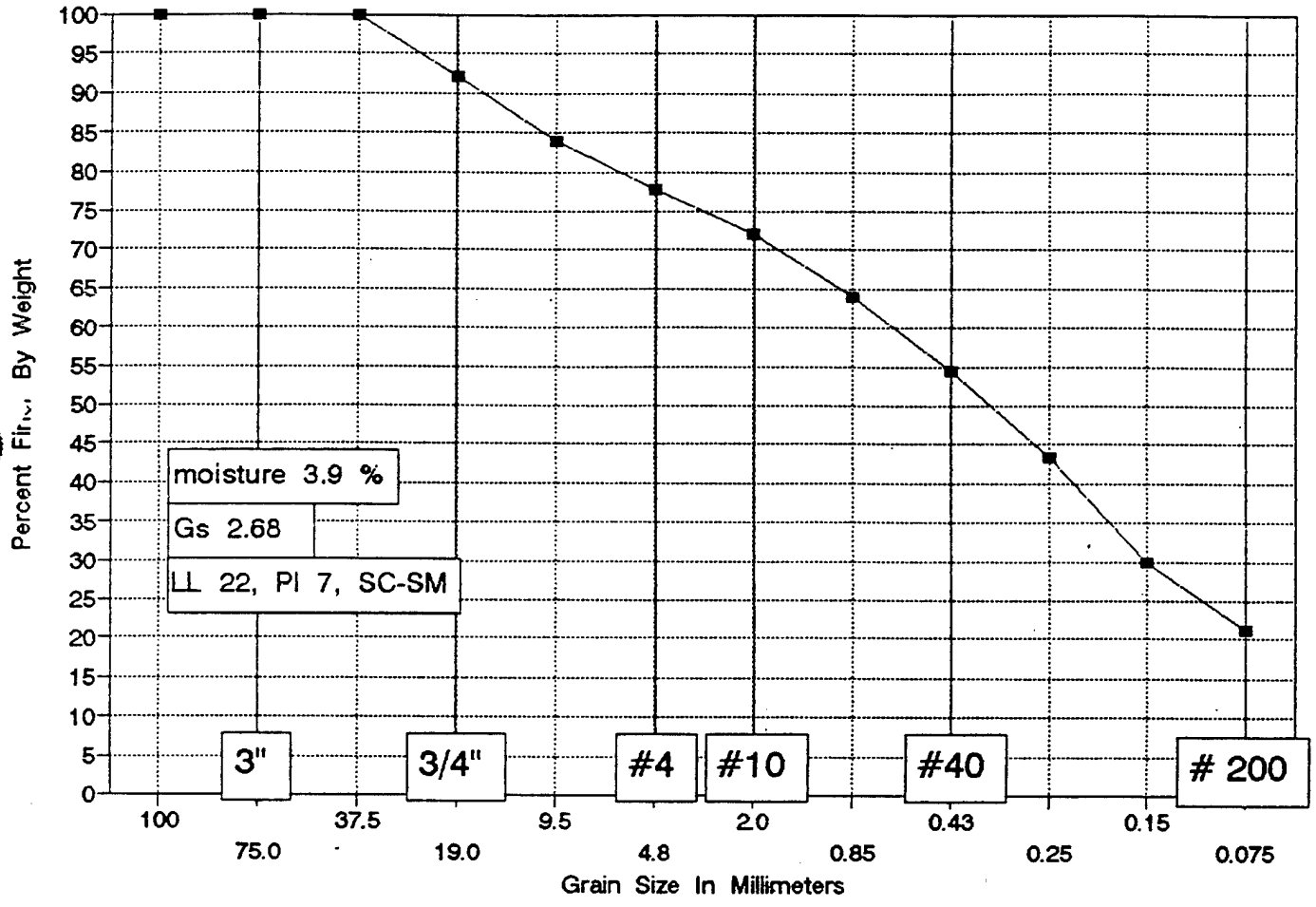
SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		21	15	6	CL-ML	

DAMES & MOORE

GRADATION CURVE

Location SB-20-019B, at 1.0-2.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-20-019B
Sample at 1-2 feet

	totals
Wt soil and dish	125.7
Dry soil & dish	122.6
Dish	43.5
wet soil	443.4
dish	10.7
dry total	416.4

Moisture Content = 3.9 %

SIEVE ANALYSIS

Total sample dry = 416.4 g

Weight of sample split #4 81.5 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	33.18	92.03%	92.0	19.0
3/8 inch	67.19	83.86%	83.9	9.5
# 4	93.03	77.66%	77.7	4.8
# 10	5.8	72.13%	72.1	2.0
# 20	14.15	64.17%	64.2	0.85
# 40	24.41	54.40%	54.4	0.43
# 60	35.99	43.36%	43.4	0.25
# 100	50.01	30.01%	30.0	0.15
# 200	59.3	21.15%	21.2	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING GB-20 SAMPLE 019B DEPTH 1-2' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	443.4
WT. OF ~~RINGS~~ DRY	10.7
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	m.c.	1/22 #4	1/25 #4	
PAN	E9	213	211	
WT. OF PAN & WET SOIL	125.7	214.9	195.8	
WT. OF PAN & DRY SOIL	122.6	214.0	193.7	
WT. OF MOISTURE				
WT. OF PAN	43.5	112.1	112.2	
WT. OF DRY SOIL				
MOISTURE CONTENT %	3.9			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"		0			
☐			3/4"		33.18			
☐			3/8"		67.19			
☑			#4		93.03			
☐			#10		5.00			
☐			#20		14.15			
☑			#40		24.41			
☐			#60		35.99			
☐			#100		50.01			
☐			#200		59.30			
☐								
☐								

AL only

(31)

NOTE: Gs 2.68

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER MONTGOMERY [illegible]

LOCATION TEAD-11 [illegible]

BORING [illegible] SAMPLE [illegible] DEPTH [illegible]

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

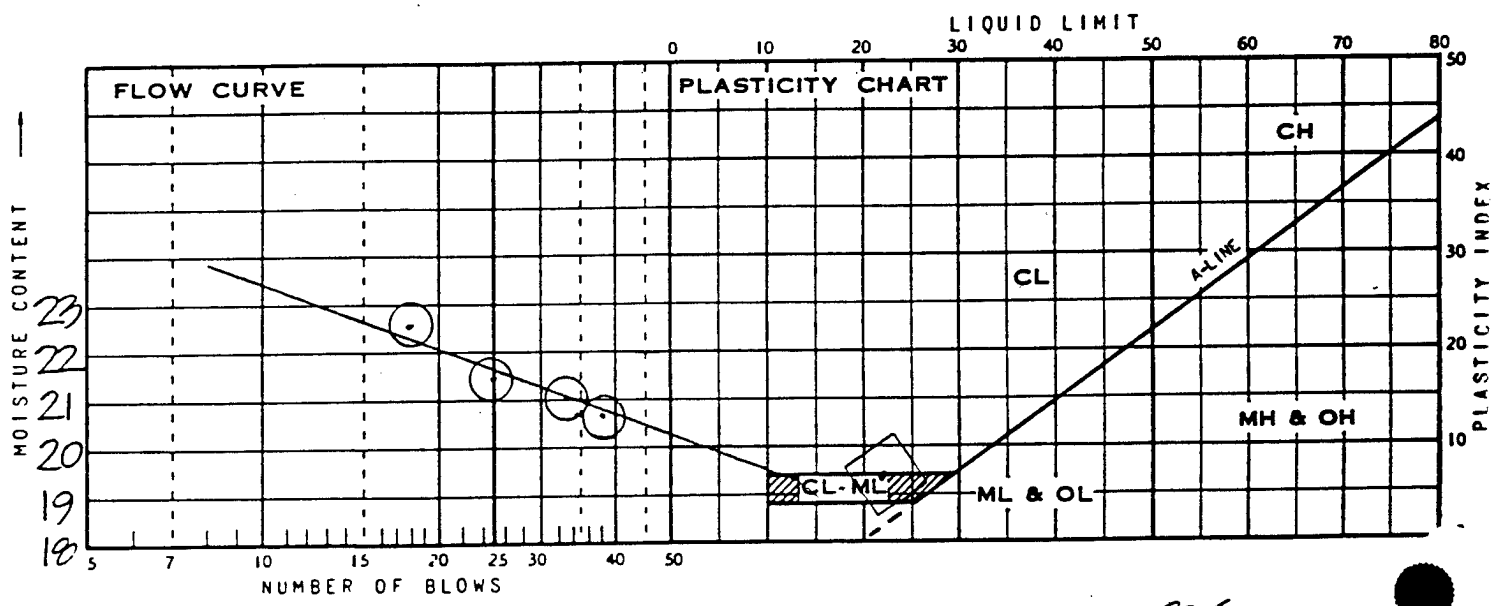
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible]

DETERMINATION	1	2	3	4	5	6
DISH	96	107				
WT OF DISH + WET SOIL	11.40	11.58				
WT OF DISH + DRY SOIL	10.08	10.25	—	—	—	—
WT OF MOISTURE						
WT OF DISH	1.38	1.40	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	15.21	15.03	$\bar{X}$=15			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	105	30	104	114		
NUMBER OF BLOWS	38	33	25	18		
WT OF DISH + WET SOIL	14.27	14.81	15.43	15.95		
WT OF DISH + DRY SOIL	12.06	12.48	12.92	13.27	—	—
WT OF MOISTURE						
WT OF DISH	1.40	1.40	1.40	1.39	—	—
WT OF DRY SOIL						
MOISTURE CONTENT	20.73	21.03	21.47	22.58		



SUMMARY

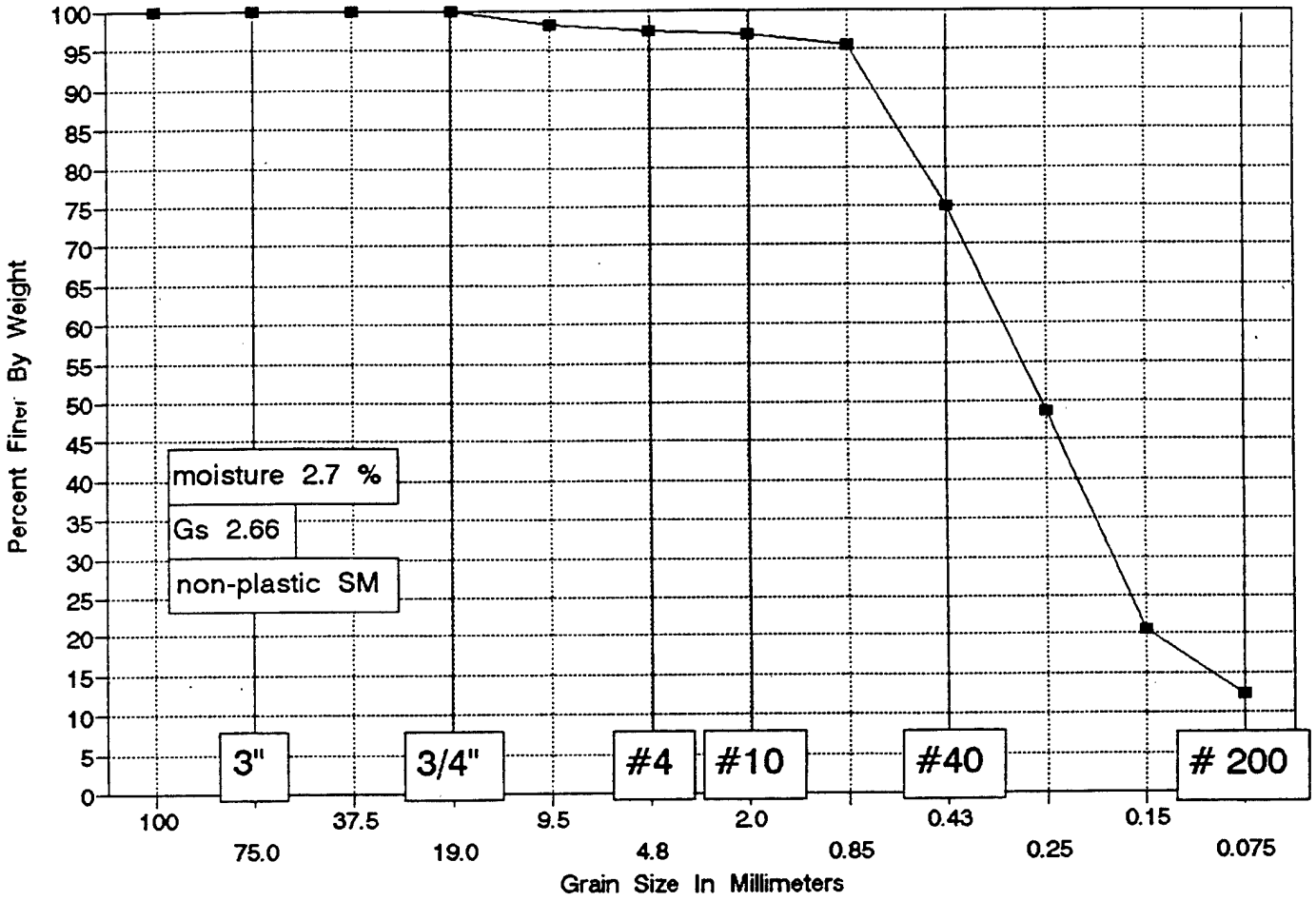
EGL

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		22	15	7	CL-ML	

DAMES & MOORE

GRADATION CURVE

Location SB-BK-007B, at 1.5-3.0 ft



Montgomery Watson
TEAD-N Phase II RFI

Boring SB-BK-007B
Sample at 1.5-3 feet

Moisture Content = 2.7 %

	totals
Wt soil and dish	127
Dry soil & dish	124.8
Dish	43.6
wet soil	503.7
dish	13.9
dry total	476.9

SIEVE ANALYSIS

Total sample dry = 476.9 g

Weight of sample split #4 122.6 g

Sieve #	weight retained	Finer	% Finer	mm
4.0 inch	0	100.00%	100.0	100
3.0 inch	0	100.00%	100.0	75.0
1.5 inch	0	100.00%	100.0	37.5
3/4 inch	0	100.00%	100.0	19.0
3/8 inch	8.28	98.26%	98.3	9.5
# 4	12.08	97.47%	97.5	4.8
# 10	0.74	96.88%	96.9	2.0
# 20	2.42	95.54%	95.5	0.85
# 40	28.37	74.91%	74.9	0.43
# 60	61.44	48.62%	48.6	0.25
# 100	96.56	20.70%	20.7	0.15
# 200	106.99	12.41%	12.4	0.075

MECHANICAL ANALYSIS

SA ☑ HA ☐ BLK SA ☐ -#200 ☐

OWNER/CLIENT Montgomery Watson JOB NUMBER 05461-029-6081

LOCATION/PROJECT TEAD-N Phase II RFI DATE 1/21/94

BORING GB-BK SAMPLE 007B DEPTH 1.5-3' BY LAF

JAR ~~DENSITY~~	total WT.
HEIGHT= DIAMETER=	
NUMBER OF RINGS	
WT. OF ~~RINGS~~ & WET SOIL	503.7
WT. OF ~~RINGS~~ Dish	13.9
WT. OF WET SOIL	
FIELD DENSITY	
DRY DENSITY	

MOISTURE ANALYSIS	M.C.	1/22 #4	1/25 #4	
PAN	A22	98	309	
WT. OF PAN & WET SOIL	127.0	120.3	233.0	
WT. OF PAN & DRY SOIL	124.8	120.2	231.4	
WT. OF MOISTURE				
WT. OF PAN	43.6	107.8	108.8	
WT. OF DRY SOIL				
MOISTURE CONTENT %	2.7			

SAMPLE CONTAINER _____ TOTAL WEIGHT OF OVEN DRIED SAMPLE _____

TOTAL WEIGHT OF BULK SAMPLE (LBS) _____ DRY SIEVE _____ WASH SIEVE _____

SAMPLE SPLIT	PAN NUMBER	PAN WEIGHT	SIEVE NUMBER	WEIGHT RETAINED	ACCUMULATIVE WEIGHT RETAINED	ACCUMULATIVE PERCENT PARTIAL RETAINED	ACCUMULATIVE PERCENT PARTIAL FINER	ACCUMULATIVE PERCENT TOTAL FINER
☐								
☐								
☐			3"					
☐			1-1/2"					
☐			3/4"		0			
☐			3/8"		8.28			
☑			#4		12.08			
☐			#10		.74			
☐			#20		2.42			
☑			#40		28.37			
☐			#60		61.44			
☐			#100		916.56			
☐			#200		106.99			
☐								

AL only

(32)

NOTE: Gs 2.66

Dames & Moore

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. _____

CLIENT/OWNER MONTGOMERY WATSON

LOCATION TEAD-N RF1

BORING SB-BK SAMPLE 007B DEPTH 15-3'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

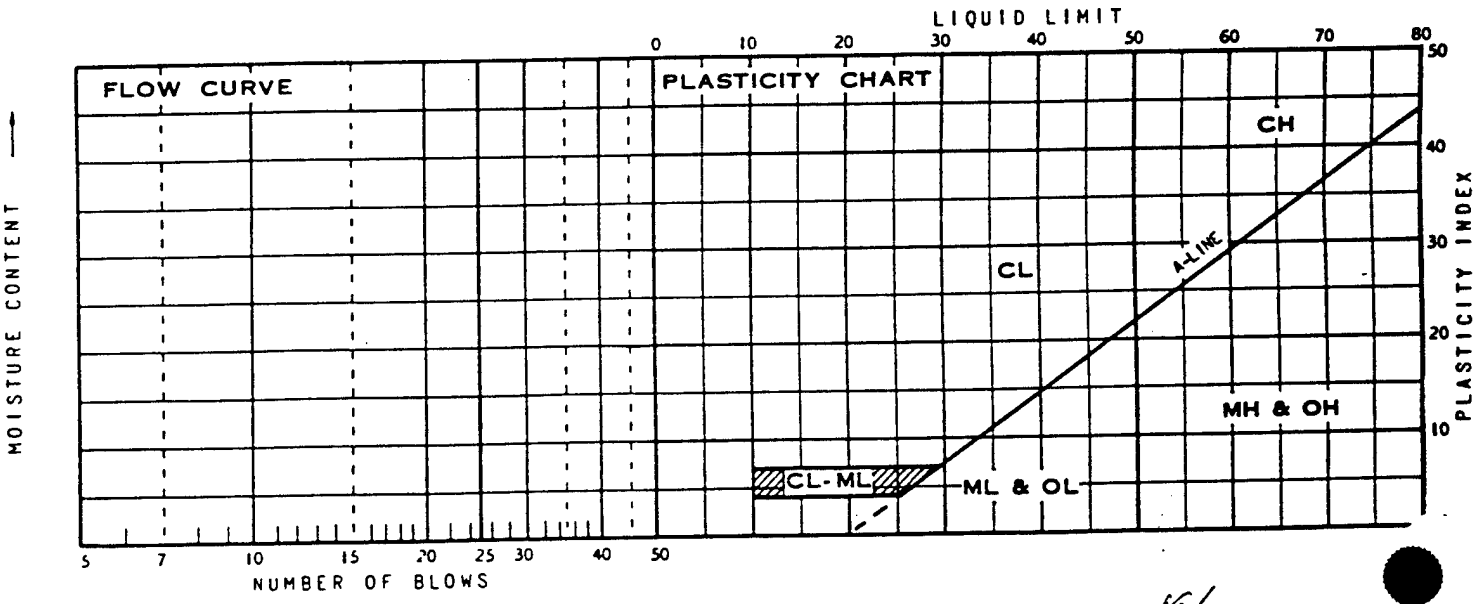
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RH 1/27/94

DETERMINATION	1	2	3	4	5	6
DISH						
WT OF DISH + WET SOIL			NON PLASTIC			
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	DIFFICULT TO THREAD			—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
					NP	

EGI

DAMES & MOORE

SPECIFIC GRAVITY TEST

JOB NO. -6081 OWNER Montgomery Watson

TESTED BY LAF DATE 1/27/94

	(1-2')	(18-20')	(2-3')
DETERMINATION NO.	SB-20 011B	SB-34 003E	SB-20 012C
FLASK NO.	3	4	5
WT. FLASK + WATER + SOIL, W_1	659.11	701.12	698.81
TEMPERATURE IN °C, T.	22.0°	22.0°	22.0°
WT. FLASK + WATER, W_2	640.93	682.15	680.71
DISH NO.	126	124	127
WT. DISH + DRY SOIL	48.11	49.35	47.62
WT. DISH	18.97	18.92	18.88
WT. SOIL, W_s	29.33	30.43	28.74
SPECIFIC GRAVITY OF WATER AT T, G_T	0.9996	0.9996	0.9996
SPECIFIC GRAVITY OF SOIL, G_s	2.632	2.657	2.703

REMARKS

$$G_s = \frac{G_T W_s}{W_s + W_2 - W_1}$$

SPECIFIC GRAVITY TEST

JOB NO. -6081 OWNER Montgomery Watson

TESTED BY LAF DATE 1/27/94

	(2-3')	(4-5')	(75-77')
DETERMINATION NO.	SB-20 018C	SB-34 003B	SB-42 017
FLASK NO.	6	7	8
WT. FLASK + WATER + SOIL, W_1	705.70	703.48	701.81
TEMPERATURE IN °C, T.	22.0°	22.5°	22.0°
WT. FLASK + WATER, W_2	684.53	682.86	687.48
DISH NO.	131	120	128
WT. DISH + DRY SOIL	52.77	52.21	41.79
WT. DISH	18.90	19.01	19.05
WT. SOIL, W_s	33.87	33.20	22.74
SPECIFIC GRAVITY OF WATER AT T, G_T	0.9996	0.9995	0.99
SPECIFIC GRAVITY OF SOIL, G_s	2.669	2.641	2.706

REMARKS

$$G_s = \frac{G_T W_s}{W_s + W_2 - W_1}$$

SPECIFIC GRAVITY TEST

JOB NO. -6081 OWNER Montgomery Watson

TESTED BY LaF DATE 1/25/94

	(0-1')	(1-2')	(1.5-3')	(1-2')
DETERMINATION NO.	SB-20 016A	SB-20 001B	SB-BK 007B	SB-20 019B
FLASK NO.	9	10	11	12
WT. FLASK + WATER + SOIL, W_1	682.41	677.50	687.86	682.60
TEMPERATURE IN °C, T.	21.0°	21.0°	21.0°	21.0°
WT. FLASK + WATER, W_2	661.12	658.45	660.71	659.53
DISH NO.	123	128	129	130
WT. DISH + DRY SOIL	53.06	49.26	62.41	55.78
WT. DISH	19.14	18.93	18.92	18.94
WT. SOIL, W_s	33.92	30.33	43.49	36.84
SPECIFIC GRAVITY OF WATER AT T, G_T	0.9998	0.9998	0.9998	0.9998
SPECIFIC GRAVITY OF SOIL, G_s	2.687	2.690	2.663	2.676

REMARKS

$$G_s = \frac{G_T W_s}{W_s + W_2 - W_1}$$

SPECIFIC GRAVITY TEST

JOB NO. -6081 OWNER Montgomery Watson

TESTED BY LAF DATE 1/29/9A

	(3-5')	(0-2')	(0-1')	(0-1')
DETERMINATION NO.	SB-42 046B	SB-42 037A	SB-20 002A	SB-20 006A
FLASK NO.	5	6	7	8
WT. FLASK + WATER + SOIL, W_1	702.87	707.70	702.32	709.21
TEMPERATURE IN °C, T.	21.0°	21.0°	21.0°	21.0°
WT. FLASK + WATER, W_2	680.80	684.58	683.00	687.52
DISH NO.	120	121	125	122
WT. DISH + DRY SOIL	54.15	56.21	50.23	53.99
WT. DISH	18.95	18.95	18.90	19.02
WT. SOIL, W_s	35.20	37.26	31.33	34.97
SPECIFIC GRAVITY OF WATER AT T, G_T	0.9998	0.9998	0.9998	0.99
SPECIFIC GRAVITY OF SOIL, G_s	2.682	2.636	2.610	2.634

REMARKS

$$G_s = \frac{G_T W_s}{W_s + W_2 - W_1}$$

SPECIFIC GRAVITY TEST

JOB NO. -6081 OWNER Montgomery Watson

TESTED BY LaF DATE 1/22/94

	(12.5-15')	(25-3')	(0-2')	(0-1.5')
DETERMINATION NO.	SB-34 002D	SB-37 003C	SB-34 001A	SB-BK 010A
FLASK NO.	6	7	8	9
WT. FLASK + WATER + SOIL, W_1	704.82	711.85	709.24	687.14
TEMPERATURE IN °C, T.	20.0°	20.5°	20.5°	20.5°
WT. FLASK + WATER, W_2	684.65	683.08	687.62	661.15
DISH NO.	124	125	126	127
WT. DISH + DRY SOIL	50.99	65.00	53.62	60.28
WT. DISH	18.89	18.84	18.96	18.85
WT. SOIL, W_s	32.10	46.16	34.66	41.43
SPECIFIC GRAVITY OF WATER AT T, G_T	1.0000	0.9999	0.9999	0.9999
SPECIFIC GRAVITY OF SOIL, G_s	2.691	2.655	2.658	2.684

REMARKS

$$G_s = \frac{G_T W_s}{W_s + W_2 - W_1}$$

SPECIFIC GRAVITY TEST

JOB NO. -6081 OWNER Montgomery Watson

TESTED BY LAF DATE 1/22/04

	(1.5-3')	(0-2')	(0-0.5')	(0-0.5')
DETERMINATION NO.	SB-42 018	SB-34 003A	SB-37 016	SB-37 020
FLASK NO.	10	2	3	4
WT. FLASK+WATER+SOIL, W_1	681.18	700.53	660.55	701.20
TEMPERATURE IN °C, T.	20.5°	20.5°	21.0°	20.5°
WT. FLASK+WATER, W_2	658.49	683.20	640.96	682.35
DISH NO.	128	126	127	124
WT. DISH+DRY SOIL	54.99	46.73	50.39	49.46
WT. DISH	18.81	18.91	18.92	18.91
WT. SOIL, W_s	36.18	27.82	31.47	30.55
SPECIFIC GRAVITY OF WATER AT T, G_T	0.9999	0.9999	0.9998	0.999
SPECIFIC GRAVITY OF SOIL, G_s	2.662	2.653	2.650	2.612

REMARKS

$$G_s = \frac{G_T W_s}{W_s + W_2 - W_1}$$

SPECIFIC GRAVITY TEST

JOB NO. -6081 OWNER Montgomery Watson

TESTED BY LaE DATE 1/22/94

	(0-2')	(2-4')	(3-5')	(0-0.5')
DETERMINATION NO.	SB-42 033A	SB-42 021B	SB-42 029	SB-BK 011A
FLASK NO.	2	3	4	5
WT. FLASK + WATER + SOIL, W_1	706.33	662.05	708.16	704.00
TEMPERATURE IN °C, T.	20.5°	20.5°	20.0°	20.5°
WT. FLASK + WATER, W_2	683.20	641.02	682.42	680.85
DISH NO.	120	121	122	123
WT. DISH + DRY SOIL	56.03	52.49	60.31	55.90
WT. DISH	18.91	18.88	18.97	18.97
WT. SOIL, W_s	37.12	33.61	41.34	36.93
SPECIFIC GRAVITY OF WATER AT T, G_T	0.9999	0.9999	1.0000	0.9999
SPECIFIC GRAVITY OF SOIL, G_s	2.654	2.672	2.650	2.680

REMARKS

$$G_s = \frac{G_T W_s}{W_s + W_2 - W_1}$$

SPECIFIC GRAVITY TEST

JOB NO. -6081 OWNER Montgomery Watson

TESTED BY VaF DATE 1/28/94

	(70-72')	(70-72')	(35-37')	(35-37')
DETERMINATION NO.	N-143 93	SB-42 016	SB-42 014	N-143 93
FLASK NO.		6	7	8
WT. FLASK+WATER+SOIL, W_1	*	706.23	705.15	706.18
TEMPERATURE IN °C, T.		18.5°	19.0°	18.5°
WT. FLASK+WATER, W_2		684.69	683.25	687.83
DISH NO.		125	130	122
WT. DISH+DRY SOIL		53.09	54.14	48.29
WT. DISH		18.90	18.89	18.96
WT. SOIL, W_s		34.19	35.25	29.33
SPECIFIC GRAVITY OF WATER AT T, G_T		1.0003	1.0002	1.000
SPECIFIC GRAVITY OF SOIL, G_s	*	2.701	2.640	2.670

REMARKS

* could not run test - only @ #4 material
See Sieve

$$G_s = \frac{G_T W_s}{W_s + W_2 - W_1}$$

SPECIFIC GRAVITY TEST

JOB NO. -6081 OWNER Montgomery Watson

TESTED BY LaF DATE 1/28/94

	(5-7')	(765-77')	(20-22')	(60-62')
DETERMINATION NO.	GB-42 017	GB-42 015	GB-42 014	GB-42 017
FLASK NO.	2	3	4	5
WT. FLASK + WATER + SOIL, W_1	702.09	659.74	701.20	701.03
TEMPERATURE IN °C, T.	18.0°	18.5°	18.0°	18.5°
WT. FLASK + WATER, W_2	683.46	641.23	682.67	681.04
DISH NO.	131	124	121	126
WT. DISH + DRY SOIL	48.73	48.38	49.02	50.69
WT. DISH	18.95	18.94	19.08	19.02
WT. SOIL, W_s	29.78	29.44	29.94	31.67
SPECIFIC GRAVITY OF WATER AT T, G_T	1.0004	1.0003	1.0004	1.0003
SPECIFIC GRAVITY OF SOIL, G_s	2.669	2.692	2.622	2.710

REMARKS

$$G_s = \frac{G_T W_s}{W_s + W_2 - W_1}$$

SPECIFIC GRAVITY TEST

JOB NO. -6081 OWNER Montgomery Water

TESTED BY LAF DATE 1/2[illegible]4

	(45-47')	(90-92')	(115-17')
DETERMINATION NO.	N-142 93	N-142 93	N-143 93
FLASK NO.	9	9	10
WT. FLASK + WATER + SOIL, W_1	706.43	684.29	678.00
TEMPERATURE IN °C, T.	20.5°	20.5°	20.5°
WT. FLASK + WATER, W_2	687.62	661.15	658.49
DISH NO.	131	124	120
WT. DISH + DRY SOIL	48.80	55.81	49.74
WT. DISH	18.99	19.33	19.16
WT. SOIL, W_s	29.81	36.48	30.58
SPECIFIC GRAVITY OF WATER AT T, G_T	0.9999	0.9999	0.999[illegible]
SPECIFIC GRAVITY OF SOIL, G_s	2.711	2.735	2.763

REMARKS

$$G_s = \frac{G_T W_s}{W_s + W_2 - W_1}$$

SPECIFIC GRAVITY TEST

JOB NO. -6081 OWNER Montgomery Watson

TESTED BY LAF DATE 1/28/97

	(5-7')	(15-17')	(0-2')	(20-22')
DETERMINATION NO.	N-142 93	N-142 93	N-142 93	N-143 93
FLASK NO.	9		2	3
WT. FLASK + WATER + SOIL, W_1	682.19		706.56	660.48
TEMPERATURE IN °C, T.	19.0°	*	20.5°	20.5°
WT. FLASK + WATER, W_2	661.32		683.20	641.02
DISH NO.	123		128	127
WT. DISH + DRY SOIL	52.13		56.26	49.78
WT. DISH	18.91		18.83	18.90
WT. SOIL, W_s	33.22		37.43	30.88
SPECIFIC GRAVITY OF WATER AT T, G_T	1.0002		0.9999	0.9999
SPECIFIC GRAVITY OF SOIL, G_s	2.689	*	2.661	2.705

REMARKS

* could not run test - small sample mostly + #4 material see sieve

$$G_s = \frac{G_T W_s}{W_s + W_2 - W_1}$$

SPECIFIC GRAVITY TEST

JOB NO. -6081 OWNER Montgomery Watson

TESTED BY laF DATE 1/2[redacted]/94

	(70-72')	(0-2')	(80-82')	(40-41')
DETERMINATION NO.	N-142 93	N-143 93	N-142 93	N-143 93
FLASK NO.	4	5	6	7
WT. FLASK + WATER + SOIL, W_1	706.94	704.31	707.15	705.65
TEMPERATURE IN °C, T.	20.0°	20.5°	20.5°	20.5°
WT. FLASK + WATER, W_2	682.42	680.85	684.63	683.05
DISH NO.	130	122	123	121
WT. DISH + DRY SOIL	58.08	56.63	55.09	55.03
WT. DISH	18.82	18.87	18.98	19.02
WT. SOIL, W_s	39.26	37.76	36.11	36.01
SPECIFIC GRAVITY OF WATER AT T, G_T	1.0000	0.9999	0.9999	0.99[redacted]
SPECIFIC GRAVITY OF SOIL, G_s	2.664	2.641	2.658	2.680

REMARKS

$$G_s = \frac{G_T W_s}{W_s + W_2 - W_1}$$

APPENDIX K

RISK ASSESSMENT EXPOSURE MODELS

K.1.0.1 Appendix K contains the equations and results for the baseline risk assessment. The appendix is divided into three main sections. The first section (Section K-1) is a summary of the general exposure equations, and the SWMU-specific reasonable maximum exposure (RME) and central tendency exposure (CTE) parameters used for each SWMU. The second section (Section K-2) is subdivided by SWMU and contains the following SWMU specific risk calculations:

- Toxicity Indices calculations used for the selection of contaminants of potential concern (COPCs).
- Calculations for the estimates of the RME and CTE excess lifetime cancer risk and hazard quotients.
- Calculations from the State of California Lead Model (DTSC, 1992) for adult receptors.
- Output from the EPA IEUBK Lead 0.5 Model (EPA, 1991) for child receptors.

The final section (Section K-3) is the results of the ecological evaluations of contaminants of potential ecological concern (COPECs) and a summary of ecological toxicity quotients (ETQs) for all SWMUs.

SECTION K-1

RME AND CTE EXPOSURE EQUATIONS AND PARAMETERS FOR RISK CALCULATIONS

Reasonable Maximum Exposure (RME) Parameters Used in Risk Calculations

1. INTAKE OF CONTAMINATED SOIL BY INGESTION

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

where:

CS	=	Chemical Concentration in Soil (mg/kg)
IR	=	Ingestion Rate (mg-soil/day)
CF	=	Units Conversion Factor (kg/mg)
FI	=	Fraction Ingested from Contaminated Source (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

CURRENT EXPOSURES

Intake of contaminated soil by ingestion for Depot personnel at SWMUs 1, 1b, 1c, 1d, 20, 21, 37 and 42.

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
IR	=	SWMU 1 : 480 mg/day based on activities involving substantial contact with soil (USEPA, 1991) SWMUs 1b and 1c: 10 mg/day, professional judgment assuming one hour on site in vehicle (i.e. order of magnitude estimate based on 50 mg/day divided by 8 hours rounded to 10 mg/day) SWMUs 1d, 20, 21, 37, and 42: 50 mg/day (USEPA, 1991)
CF	=	10^{-6} kg/mg
FI	=	1
EF	=	SWMU 1: 170 days/year based on 250 days per year adjusted for 8 months of operations (March through October, Snyder, 1994). SWMUs 1b and 1c: 50 days/year based on an assumed site visit frequency of once per week by security personnel; there are no regular activities at SWMUs 1b and 1c (Snyder, 1994) SWMU 1d: 125 days/year based on six months per year of unfrozen, snow-free ground with temperatures warm enough not to wear gloves and no source of indoor exposure (one-half of default value of 250 days/year, USEPA, 1991) SWMUs 20, 21, 37, and 42: 250 days/year (USEPA, 1991)
ED	=	25 years (USEPA, 1991) SWMU 42: 3 years based on assignment duration for marines (Francis, 1994)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

The workers at SWMU 1 excavate pits as part of their duties and have similar exposures to soil as a construction worker. The default ingestion rate for soil for a construction worker is 480 milligrams per day (USEPA, 1991). This value is derived in part from an unvalidated soil adherence rate of 3.5 mg/cm^2. More recent studies have shown

1.0 mg/cm^2 is a more appropriate adherence rate (USEPA, 1992), and therefore the soil ingestion rate is likely overestimated by a factor of 3.5.

FUTURE EXPOSURES

Intake of contaminated soil by ingestion for Depot personnel in the future at SWMUs 34 and 48.

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
IR	=	50 mg/day (USEPA, 1991)
CF	=	10^{-6} kg/mg
FI	=	1
EF	=	250 days/year (USEPA, 1991)
ED	=	25 years (USEPA, 1991)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

Intake of contaminated soil by ingestion for construction workers assuming one year project at SWMUs 1, 1b, 1c, 1d, 20, 21, 34, 37, 42, 45, and 48

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
IR	=	480 mg/day (USEPA, 1991)
CF	=	10^{-6} kg/mg
FI	=	1
EF	=	125 days/year, based on best professional judgment assuming that the intrusive construction activities (as compared to non-intrusive activities such as framing, wiring, painting, etc.) last for six months
ED	=	1 year
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

Intake of contaminated soil by ingestion for future adult residents at SWMUs 1, 1b, 1c, 1d, 20, 21, 34, 37, 42, 45, and 48

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
IR	=	100 mg/day (USEPA, 1991)
CF	=	10^{-6} kg/mg
FI	=	1
EF	=	350 days/year (USEPA), 1991)
ED	=	24 years (USEPA, 1991)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x 70 years (carcinogenic effects)

Intake of contaminated soil by ingestion for future child residents at SWMUs 1, 1b, 1c, 1d, 20, 21, 34, 37, 42, 45, and 48

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
IR	=	200 mg/day (USEPA, 1991)
CF	=	10^{-6} kg/mg
FI	=	1
EF	=	350 days/year (USEPA, 1991)
ED	=	6 years (USEPA, 1991)
BW	=	15 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

2. INTAKE FROM DERMAL CONTACT WITH CONTAMINATED SOIL

$$\textbf{Intake (mg/kg-day)} = \frac{\textbf{CS x CF x SA x AF x ABS x EF x ED}}{\textbf{BW x AT}}$$

CS	=	Chemical Concentration in Soil (mg/kg)
CF	=	Conversion Factor (kg/mg)
SA	=	Skin Surface Area Available for Contact (cm^2)
AF	=	Soil to Skin Adherence Factor (mg/cm^2)
ABS	=	Absorption Factor (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (days)

CURRENT EXPOSURE

Intake of Depot personnel from dermal contact at SWMUs 1, 1b, 1c, 1d, 20, 21, 37, and 42

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg
SA	=	4,300 cm^2, assumes short sleeves, long pants, and shoes (USEPA, 1992)
AF	=	1.0 mg/cm^2, sandy silt soil (USEPA, 1992)
ABS	=	Contaminant specific: 0.1% for metals; 3% for organics (USEPA, 1992)
EF	=	SWMU 1: 170 days/year based on 250 days per year adjusted for 8 months of operations (March through October, Snyder, 1994). SWMUs 1b and 1c: 50 days/year based on an assumed site visit frequency of once per week by security personnel; there are no regular activities at SWMUs 1b and 1c (Snyder, 1994). SWMUs 1d, 20, 21, 37, and 42: 125 days/year based on six months per year of unfrozen, snow-free ground when people wear the clothing described above (one-half of default value of 250 days/year, USEPA, 1991)

ED	=	25 years (USEPA, 1991) SWMU 42: 3 years based on assignment duration for marines (Francis, 1994)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

FUTURE EXPOSURE

Intake of Depot personnel in the future for dermal contact at SWMUs 34 and 48

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg
SA	=	4,300 cm^2, assumes short sleeves, long pants, and shoes (USEPA, 1992)
AF	=	1.0 mg/cm^2, sandy silt soil (USEPA, 1992)
ABS	=	Contaminant specific: 0.1% for metals; 3% for organics (USEPA, 1992)
EF	=	125 days/year based on six months per year of unfrozen, snow-free ground when people wear the clothing described above (one-half of default value of 250 days/year, USEPA, 1991)
ED	=	25 years (USEPA, 1991)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

Intake of future construction workers from dermal contact at SWMUs 1, 1b, 1c, 1d, 20, 21, 34, 37, 42, 45, and 48

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg
SA	=	4,300 cm^2, assumes short sleeves, long pants, and shoes (USEPA, 1992)
AF	=	1.0 mg/cm^2, sandy silt soil (USEPA, 1992)
ABS	=	Contaminant specific: 0.1% for metals; 3% for organics (USEPA, 1992)
EF	=	125/days/year, best professional judgment assuming that the workers wear the clothing specified above only six months of the year due to cold weather
ED	=	1 year
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

Intake of future adult residents from dermal contact at SWMUs 1, 1b, 1c, 1d, 20, 21, 34, 37, 42, 45, and 48

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg

SA = 5,800 cm^2, assumes short sleeve shirt, short pants, and shoes (USEPA, 1992)
AF = 1.0 mg/cm^2, sandy silt soil (USEPA, 1992)
ABS = Contaminant specific: 0.1% for metals; 3% for organics (USEPA, 1992)
EF = 180 days/year based on six months per year of unfrozen, snow-free ground where people wear the clothing specified above (one half of default 350 days/year, USEPA, 1991)
ED = 24 years (USEPA, 1991)
BW = 70 kg (USEPA, 1991)
AT = 365 days/year x 70 years (carcinogenic effects)

Intake of future child residents from dermal contact at SWMUs 1, 1b, 1c, 1d, 20, 21, 34, 37, 42, 45, and 48

CS = Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF = 10^{-6} kg/mg
SA = 2,600 cm^2 (short sleeve shirt, short pants, and shoes, USEPA, 1992)
AF = 1.0 mg/cm^2, sandy silt soil (USEPA, 1992)
ABS = Contaminant specific: 0.1% for metals; 3% for organics (USEPA, 1992)
EF = 180 days/year based on six months per year of unfrozen, snow-free ground where children wear the clothing specified above (one half of default 350 days/year, USEPA, 1991)
ED = 6 years (USEPA, 1991)
BW = 15 kg (USEPA, 1991)
AT = 365 days/year x 70 years (carcinogenic effects)
365 days/year x ED (noncarcinogenic effects)

3. INTAKE FROM INHALATION OF CONTAMINATED PARTICULATES

$$\textbf{Intake (mg/kg-day)} = \frac{\textbf{CA x CS x CF x IR x ET x EF x ED}}{\textbf{BW x AT}}$$

where:

CA = Concentration of Dust in Air (mg/m^3)
CS = Chemical Concentration in Soil (mg/kg)
CF = Unit Conversion factor (kg/mg)
IR = Inhalation rate(m^3/hour or m^3/day)
ET = Exposure time (hours/day or days/day)
EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
BW = Body Weight (kg)
AT = Averaging Time (period over which exposure is averaged - days)

CURRENT EXPOSURE

Inhalation of contaminated particulates by Depot personnel at SWMUs 1, 1b, 1c, 1d, 20, 21, 37, 42, and 45

CA	=	SWMUs 1 and 1d: 1 mg/m^3 based on dust monitoring during excavation activities at SWMU 1 SWMUs 1b, 1c, 20, 21, 37, and 42: 0.05 mg/m^3 based on USEPA ambient air quality standard for respirable dust
CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg
IR	=	2.5 m^3/hour (USEPA, 1989)
ET	=	SWMU 1: 3 hours/day based on time spent in dust generating activities at SWMU 1 (Snyder, 1994) SWMUs 1b and 1c: 1 hour/day based on best professional judgment for length of time on-site for security patrol SWMUs 1d, 20, 21, 37, and 42: 8 hours/day (USEPA, 1989)
EF	=	SWMU 1: 170 days/year based on 250 days per year adjusted for 8 months of operations (March through October, Snyder, 1994). SWMUs 1b and 1c: 50 days/year based on an assumed site visit frequency of once per week by security personnel; there are no regular activities at SWMUs 1b and 1c (Snyder, 1994) SWMUs 1d, 20, 21, 37, and 42: 125 days/year based on six months per year of unfrozen, snow-free ground (one-half of default value of 250 days/year, USEPA, 1991)
ED	=	25 years (USEPA, 1991) SWMU 42: 3 years based on assignment duration for Marines (Francis, 1994)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

Intake from inhalation of contaminated particulates from fugitive dust from SWMUs 1 and 42 for adult residents of Grantsville, Stockton, and depot housing.

CA	=	Modeled concentration (Cowherd et al., 1984) and dispersion (see Air Modeling presented in Item 9)
CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} mg/kg
IR	=	20 m^3/day (USEPA, 1991)
ET	=	1 day/day
EF	=	350 days/year (USEPA, 1991)
ED	=	Grantsville and Stockton: 24 years (USEPA, 1991) Depot housing: 5 years (based on discussions with Shelly Calley of the TEAD housing office)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x 70 years (carcinogenic effects)

Intake from inhalation of contaminated particulates from fugitive dust from SWMUs 1 and 42 for child residents of Grantsville, Stockton, and depot housing.

CA	=	Modeled concentration (Cowherd et al., 1984) and dispersion (see Air Modeling presented in Item 9)
CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg

IR	=	18 m^3/day based on ventilation rates and activity patterns for young children (USEPA, 1989)
ET	=	1 day/day
EF	=	350 days/year (USEPA, 1991)
ED	=	Grantsville and Stockton: 6 years (USEPA, 1991) Depot housing: 5 years (based on discussions with Shelly Calley of the TEAD housing office)
BW	=	15 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

FUTURE EXPOSURE

Inhalation of contaminated particulates by future adult residents at SWMUs 1, 1b, 1c, 1d, 20, 21, 34, 37, 42, 45, and 48

CA	=	0.05 mg/m^3, USEPA ambient air quality standard for respirable dust
CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
IR	=	20 m^3/day (USEPA, 1991)
EF	=	180 days/year based on six months per year of unfrozen, snow-free ground (one-half of default value of 250 days/year, USEPA, 1991)
ED	=	24 years (USEPA, 1991)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x 70 years (carcinogenic effects)

Inhalation of contaminated particulates by future child residents at SWMUs 1, 1b, 1c, 1d, 20, 21, 34, 37, 42, 45, and 48

CA	=	0.05 mg/m^3, USEPA ambient air quality standard for respirable dust
CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg
IR	=	18 m^3/day based on ventilation rates and activity patterns for young children (USEPA, 1989)
EF	=	180 days/year based on six months per year of unfrozen, snow-free ground (one-half of default value of 250 days/year, USEPA, 1991)
ED	=	6 years (USEPA, 1991)
BW	=	15 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

Inhalation of contaminated particulates by future Depot personnel at SWMUs 34 and 48

CA	=	0.05 mg/m^3, USEPA ambient air quality standard for respirable dust
CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg
IR	=	2.5 m^3/hour (USEPA, 1991)
ET	=	8 hours/day (USEPA, 1989)

EF	=	125 days/year based on six months per year of unfrozen, snow-free ground (one-half of default value of 250 days/year, USEPA, 1991)
ED	=	25 years (USEPA, 1991)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

Inhalation of contaminated particulates by construction workers at SWMUs 1, 1b, 1c, 1d, 20, 21, 34, 37, 42, 45, and 48

CA	=	1 mg/m^3 based on dust monitoring during excavation activities at SWMU 1
CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg
IR	=	2.5 m^3/hour (USEPA, 1991)
ET	=	8 hours/day (USEPA, 1989)
EF	=	125 days/year based on six months per year of unfrozen, snow-free ground (one-half of default value of 250 days/year, USEPA, 1991)
ED	=	1 year
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

4. INTAKE BY INGESTION OF SURFACE WATER AT SWMU 45

$$\textbf{Intake (mg/kg-day)} = \frac{\textbf{IR x CW x EF x ED x CF}}{\textbf{BW x AT}}$$

where:

IA	=	Ingestion Amount (liters/day)
CW	=	Measured Concentration in Water (µg/liter)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
CF	=	Units Conversion Factor (mg/µg)
BW	=	Body Weight (kg)
AT	=	Averaging Time (days)

CURRENT EXPOSURE

Incidental ingestion of contaminated surface water by Depot personnel

IA	=	0.05 liters/day, best professional judgment of volume of an accidental swallow of water
CW	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (µg/liter)
EF	=	6 days/year, best professional judgment of one visit per month during the warmer six months of the year
ED	=	25 years (USEPA, 1991)
CF	=	10^{-3} mg/µg
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

5. INTAKE BY DERMAL EXPOSURE TO SURFACE WATER AT SWMU 45

$$\text{Intake (mg/kg-day)} = \frac{CW \times SA \times ET \times EF \times ED \times PC}{BW \times AT}$$

where:

CW	=	Measured Concentration (mg/l)
SA	=	Exposed Body Surface (cm^2)
ET	=	Exposure Time (hours)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
PC	=	Permeability Constant (cm/hr)
BW	=	Body Weight (kg)
AT	=	Averaging Time (days)

CURRENT EXPOSURE

Intake by dermal exposure to surface water for Depot personnel

CW	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (µg/liter)
SA	=	4,560 cm^2, lower legs and feet (USEPA, 1992)
ET	=	1 hour, best professional judgment
EF	=	6 days/year, best professional judgment of one visit per month during the warmer six months of the year
ED	=	25 years (USEPA, 1991)
PC	=	Chemical specific (USEPA, 1992)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

6. INTAKE OF CONTAMINATED SEDIMENT BY INGESTION AT SWMU 45

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

where:

CS	=	Chemical Concentration in Sediment (mg/kg)
IR	=	Ingestion Rate (mg-sediment/day)
CF	=	Units Conversion Factor (kg/mg)
FI	=	Fraction Ingested from Contaminated Source (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

CURRENT EXPOSURES

Intake of contaminated sediment by ingestion for Depot personnel at SWMU 45.

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
IR	=	50 mg/day, best professional judgment assuming entire soil ingestion for work-day is from visit to this SWMU
CF	=	10^{-6} kg/mg
FI	=	1
EF	=	6 days/year, best professional judgment of one visit per month during the warmer six months of the year
ED	=	25 years (USEPA, 1991)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

7. INTAKE FROM DERMAL CONTACT WITH CONTAMINATED SEDIMENT AT SWMU 45

$$\textbf{Intake (mg/kg-day)} = \frac{\textbf{CS x CF x SA x AF x ABS x EF x ED}}{\textbf{BW x AT}}$$

CS	=	Chemical Concentration in Sediment (mg/kg)
CF	=	Units Conversion Factor (kg/mg)
SA	=	Skin Surface Area Available for Contact (cm^2)
AF	=	Soil to Skin Adherence factor (mg/cm^2)
ABS	=	Absorption Factor (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (days)

CURRENT EXPOSURE

Intake of Depot personnel from dermal contact to sediment at SWMU 45.

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg
SA	=	4,560 cm^2, lower legs and feet (USEPA, 1992)
AF	=	1.5 mg/cm^2 assuming upper end of range for soil adherence for sediment (USEPA, 1992)
ABS	=	Contaminant specific: 0.1% for metals; 3% for organics
EF	=	6 days/year, best professional judgment of one visit per month during the warmer six months of the year
ED	=	25 years (USEPA, 1991)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

8. INTAKE FROM INGESTION OF GROUNDWATER BY FUTURE RESIDENTS AT SWMU 45

$$\text{Intake (mg/kg-day)} = \frac{IR \times CW \times EF \times ED \times CF}{BW \times AT}$$

where:

IR	=	Ingestion Amount (liters)
CW	=	Contaminant Concentration in Water (µg/l)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
CF	=	Units Conversion Factor (mg/µg)
BW	=	Body Weight (kg)
AT	=	Averaging Time

Ingestion of groundwater by future adult residents

IR	=	2 l/day (USEPA, 1991)
CW	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (µg/liter)
EF	=	350 days/year (USEPA, 1991)
CF	=	10^{-3} mg/µg
ED	=	24 years (USEPA, 1991)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x 70 years (carcinogenic effects)

Ingestion of groundwater by future child residents

IR	=	0.8 l/day (USEPA, 1989)
CW	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (µg/liter)
EF	=	350 days/year (USEPA, 1991)
ED	=	6 years (USEPA, 1991)
BW	=	15 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effedts)

9. AIR MODELING FOR FUGITIVE DUST IN GRANTSVILLE, STOCKTON, AND DEPOT HOUSING FROM SWMUS 1 AND 42

Emission Rate modeling from SWMUs 1 and 42.

Limited erosion potential model for SWMU 1 (Cowherd et al., 1984)

$$E_{10} = \frac{0.83 \times f \times P(u^{+}) \times (1 - v)}{(PE/50)^{2}}$$

where:

E_{10}	=	PM_{10} emission rate (mg/m^2–hr)
f	=	frequency of disturbance per month
u^{+}	=	probable fastest mile of wind for the period between disturbances (m/sec)

v = fraction of contaminated surface covered by vegetation

$P(u^+)$ = quantity of erodible particles present on the surface prior to the onset of wind erosion (g/m^2) and is calculated as:

$$P(u^+) = 6.7(u^+ - u_t)$$

PE = Thornwaites Precipitation Evaporation Index (39 for Salt Lake City)

and:

f = SWMU 1: (16 times/month) x (8 months/year) / 12 months/year = 11 times/month, best professional judgment that conservatively assumes the entire ground surface of SWMU 1 is disturbed every day of operations (4 days/week, 8 months/year, Snyder, 1994); SWMU 42: 4 times/month (professional judgment, assumes one disturbance per week)

u^+ = 22.6 m/sec, value for Salt Lake City, UT from Table 4-1 (Cowherd et al., 1984)

u_t = SWMU 1: 3.25 m/sec, SWMU 42: 2.5 m/sec: based on Figure 4-1 of Cowherd et al. (1984) which is a graph that estimates the threshold wind speed from the threshold friction velocity and roughness height. The roughness height at SWMU 1 was assumed to be 4.2 centimeters, which is the estimated height from Figure 3-6 for a wheat field (Cowherd et al., 1984). Based on this roughness height, Figure 4-1 estimates the ratio of the threshold wind speed to the threshold friction velocity is 13. The threshold friction velocity was assumed to be 0.25 m/sec, and is the most conservative value from Figure 3-4 in Cowherd et al. (1984) and assumes the mode of the soil grain size is 100 µm. Therefore, the threshold wind speed at SWMU 1 is 13 x 0.25 m/sec, or 3.25 m/sec. At SWMU 42, the roughness height was estimated to equal 20 centimeters, based on the low end for institutional buildings. For this roughness height, the ration of the threshold wind speed to the friction velocity is 10. Therefore, the threshold wind speed at SWMU 42 is 2.5 m/sec.

v = Assumed to be 30 percent (0.30) at SWMU 1 and 40 percent (0.40) at SWMU 42 based on site observations.

$P(u^+)$ = SWMU 1: 130 g/m^2, SWMU 42: 135 g/m^2; based on values for u^+ and u_t

Dispersion Modeling for SWMUs 1 and 42

The Industrial Source Complex Long Term (ISCST) model was run to calculate dust concentrations in Grantsville, Stockton, and depot housing from emissions at SWMUs 1 and 42. Inputs to the model include the emission rate that was estimated using the model from Cowherd, et. al. (1984) as indicated in Item 9. The estimated rate at SWMU 1 was 1370 $mg/m^2/hr$ (3.8 x 10^{-4} $gm/s/m^2$); at SWMU 42 this rate was 440 mg/m2/hr (1.2 x 10^{-4} $gm/s/m^2$). The emission rate for SWMU 1 was based on the total area by idealizing the SWMU as a square approximately 122.5 meters on a side; which corresponds to a

total area of 15,000 m^2. The emission rate for SWMU 42 was based on the unpaved area with concentrations typical of the exposure point concentrations; this area was 8,300 m^2.

Grantsville lies to the north of SWMU 1 approximately 5.9 miles (9,500 meters). Stockton is east southeast of SWMU 1 approximately 6.6 miles (10,600 meters). Depot housing is approximately 6.4 miles (10,400 meters) east of SWMU 1. SWMU 42 is approximately 8.5 miles (13,700 meters) southeast of Grantsville; 4.5 miles (7240 meters) north of Stockton; and 340 meters north of depot housing. The windrose was decomposed to estimate the number of hours during the year that the wind was blowing from any of the sixteen directions shown on the wind rose. Wind speed and direction data were taken from the wind rose compiled from meteorological monitoring at TEAD-N for August 9, 1972 through November 2, 1973. Class D (neutral) distability conditions were conservatively assumed to be present at all times. The average temperature of 52°F and the average mixing layer height of 1954 meters are based on data from the Salt Lake City International Airport. Default wind profile exponents and vertical potential temperature gradients were employed, as well as rural dispersion coefficients.

10. LEAD UPTAKE MODELING

The blood lead concentration of adults was estimated using the State of California Department of Toxic Substances Control model (DTSC, 1992). The model requires the following inputs:

- The lead concentration in air was input as 0.1 $\mu g/m^3$ based on ambient concentrations in the Salt Lake Valley.
- The default value for lead uptake from food was used (i.e. uptake and consumption of homegrown produce was not considered).
- The concentration of lead in soil was the lesser of the 95 percent upper confidence limit of the mean or the maximum detected value.
- The assumed soil ingestion rate was 0.05 g/day for construction workers and depot workers at SWMU 1, and 0.025 g/day for all other depot workers and potential future residents. These are both default parameters.

All remaining parameters were the default values for the model. The 95th percentile of the blood lead concentrations is the standard point of comparison (USEPA, 1994b). Complete model outputs including the 50th, 90th, 95th, 98th, and 99th percentiles are presented in Appendix K-2 of the Phase II RFI.

The blood lead concentration in children through age six was estimated with the USEPA Biokinetic Model, version 0.99D (USEPA, 1994a). All default parameters were used, including the arithmetic mean lead concentration for the concentration in soil. The predicted 95th percentile blood lead concentration is reported in the text (USEPA, 1994b). The complete model output is presented in Appendix K-2.

11. INTAKE OF CONTAMINATED PRODUCE

$$\text{Intake (mg/kg-day)} = \frac{\left[\left(C_p \times IR_p\right) + \left(C_t \times IR_t\right)\right] \times FI \times CF \times EF \times ED}{BW \times AT}$$

where:

Cp	=	Chemical Concentration in Leafy Vegetable (mg/kg)
Ct	=	Chemical Concentration in Fruit/Tuber (mg/kg)
IRp	=	Leafy Vegetable Ingestion Rate (g-homegrown produce/day)
IRt	=	Fruit/Tuber Ingestion Rate (g-homegrown produce/day)
CF	=	Units Conversion Factor (kg/g)
FI	=	Fraction ingested from source (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

FUTURE EXPOSURE

Adult intake of contaminated leafy vegetables and fruits/tubers grown at SWMUs 1, 1b, 1c, 1d, 20, 21, 34, 37, 42, 45, and 48

Cp	=	Modeled Value
Ct	=	Modeled Value
IRp	=	197 g/day (NFCS, 1993)
IRt	=	59 g/day (NFCS, 1993)
CF	=	10^{-3} kg/g
FI	=	0.6 (McKone, 1994)
EF	=	350 days/year (USEPA, 1991)
ED	=	24 years (USEPA, 1991)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x 70 years (carcinogenic effects)

Child intake of contaminated leafy vegetables and fruits/tubers grown at SWMUs 1, 1b, 1c, 1d, 20, 21, 34, 37, 42, 45, and 48

Cp	=	Modeled Value
Ct	=	Modeled Value
IRp	=	141 g/day (NFCS, 1993)
IRt	=	42 g/day (NFCS, 1993)
CF	=	10^{-3} kg/g
FI	=	0.6 (McKone, 1994)
EF	=	350 days/year (USEPA, 1991)
ED	=	6 years (USEPA, 1991)
BW	=	15 kg (USEPA, 1991)
AT	=	365 days/year x 70 years (carcinogenic effects) 365 days/year x ED (noncarcinogenic effects)

Uptake of contaminants by plants can occur through the roots or through aerial deposition on leaves. Because aerial deposition occurs primarily through wind erosion (which is a random, intermittent event that may affect soils that do not contain SWMU-related chemicals), only root uptake was modeled. Homegrown produce was divided into two categories: (1) leafy vegetables and (2) tubers and fruits. The equation for the concentration of chemicals in leafy vegetables from root uptake is:

$$Cp = CS \times K_{p(leafy)}$$

where:

Cp	=	Chemical Concentration in Leafy Vegetable (mg/kg)
CS	=	Chemical Concentration in Soil (mg/kg)
$K_{p(leafy)}$	=	Soil-to-Vegetation Uptake Factor for Leafy Vegetables (unitless)

and

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
$K_{p(leafy)}$	=	Chemical specific (see Table K-1)

The equation for the concentration of chemicals in fruits and tubers from root uptake is:

$$Ct = CS \times K_{p(root)}$$

where:

Ct	=	Chemical Concentration in Tubers/Fruit (mg/kg)
CS	=	Chemical Concentration in Soil (mg/kg)
$K_{p(root)}$	=	Soil-to-Vegetation Uptake Factor for Tubers/Fruit (unitless)

and

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
$K_{p(root)}$	=	Chemical specific (see Table K-1)

12. INTAKE OF CONTAMINATED BEEF

$$\textbf{Intake (mg/kg-day)} = \frac{\textbf{CB x IR x FI x EF x ED}}{\textbf{BW x AT}}$$

where:

CB	=	Chemical Concentration in Beef (mg/kg)
IR	=	Ingestion Rate (kg-homegrown beef/day)
FI	=	Fraction ingested from source (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

CURRENT EXPOSURE

Adult intake of contaminated beef from cattle raised at SWMU 1

CB	=	Modeled Value
IR	=	0.082 kg/day (USEPA, 1991)
FI	=	0.88 (McKone, 1994)
EF	=	350 days/year (USEPA, 1991)
ED	=	24 years (USEPA, 1991)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x 70 years (carcinogenic effects)

TABLE K-1

VEGETABLE AND BEEF UPTAKE FACTORS

Compound	Log Kow (unitless)	$Kp_{(leafy)}$ (unitless)	$Kp_{(roots)}$ (unitless)	Bb (day/kg)
VOCs				
Ethylbenzene	3.15	1.15E-01	4.01E+00	3.55E-05
Toluene	2.7	2.09E-01	7.32E+00	1.26E-05
Xylenes	3.1	1.23E-01	4.29E+00	3.16E-05
BNAEs				
Acenaphthene	4.00	3.69E-02	1.29E+00	2.51E-04
Acenaphthylene	4.07	3.36E-02	1.17E+00	2.95E-04
Anthracene	4.45	2.02E-02	7.07E-01	7.08E-04
Benzo(a)anthracene	5.60	4.35E-03	1.52E-01	1.00E-02
Carcinogenic PAHs	6.06	2.35E-03	8.24E-02	2.88E-02
Benzo(a)pyrene	6.06	2.35E-03	8.24E-02	2.88E-02
Benzo(g,h,i)perylene	6.15	2.09E-03	7.30E-02	3.55E-02
Benzo(b)flouranthene	6.06	2.35E-03	8.24E-02	2.88E-02
Chrysene	5.61	4.29E-03	1.50E-01	1.02E-02
Fluoranthene	4.90	1.11E-02	3.88E-01	2.00E-03
Fluorene	4.20	2.82E-02	9.88E-01	3.98E-04
Phenanthrene	4.57	1.72E-02	6.03E-01	9.33E-04
Pyrene	4.88	1.14E-02	3.98E-01	1.91E-03
Bis(2-ethylhexyl)phthalate	4.5	1.89E-02	6.62E-01	7.94E-04
Dimethyl phthalate	1.56	9.59E-01	3.36E+01	9.12E-07
Di-n-butyl phthalate	4.72	1.41E-02	4.93E-01	1.32E-03
Hexachlorobenzene	5.27	6.76E-03	2.37E-01	4.68E-03
Napthalene	3.30	9.39E-02	3.29E+00	5.01E-05
n-Nitrosodiumphenylamine	--	NC	NC	NC

Uptake factors for organics were estimated using regression equations presented in McKone (1994); uptake factors for metals are from Baes et al. (1984) and Stevens (1992), as cited in Rust E&I, 1996. Dry-to-wet weight conversion factors of 0.07 for leafy vegetables and 0.22 for tubers and fruits (Baes et al., 1984) are included in the vegetable uptake factors for metals.

Kp(leafy)	Soil-to-vegetation uptake factor for leafy vegetables.
Kp(roots)	Soil-to-vegetation uptake factor for tubers/fruits
Bb	Feed-to-beef uptake factor
VOCs	Volatile organic compounds
BNAEs	Base, neutral, and acid extractable compounds
Log Kow	Octanol-water partition coefficient
NC	Not calculated
--	Not available

TABLE K-1

VEGETABLE AND BEEF UPTAKE FACTORS

Compound	Log Kow (unitless)	$Kp_{(leafy)}$ (unitless)	$Kp_{(roots)}$ (unitless)	Bb (day/kg)
Pesticides/Herbicides				
Aldrin	6.50	1.31E-03	4.58E-02	7.94E-02
Chlorodane (alpha and gamma)	5.54	4.71E-03	1.65E-01	8.71E-03
24D	--	NC	NC	NC
Dieldrin	4.32	2.40E-02	8.41E-01	5.25E-04
Endrin	--	NC	NC	NC
Heptachlor	5.27	6.76E-03	2.37E-01	4.68E-03
Lindane	3.61	6.20E-02	2.17E+00	1.02E-04
DDD	6.20	1.95E-03	6.83E-02	3.98E-02
DDE	7.00	6.71E-04	2.35E-02	2.51E-01
DDT	6.19	1.98E-03	6.92E-02	3.89E-02
Explosives				
2,4,6-Trinitrotoluene	1.6	9.09E-01	3.18E+01	1.00E-06
2,4-Dinitrotoluene	1.98	5.47E-01	1.91E+01	2.40E-06
2,6-Dinitrotoluene	1.9	6.09E-01	2.13E+01	2.00E-06
1,3-Dinitrobenzene	1.49	1.05E+00	3.68E+01	7.76E-07
1,3,5-Trinitrobenzene	1.18	1.59E+00	5.57E+01	3.80E-07
Cyclonite (RDX)	0.87	2.41E+00	8.43E+01	1.86E-07
HMX	0.13	6.47E+00	2.27E+02	3.39E-08
Tetryl	2	5.33E-01	1.86E+01	2.51E-06
Dioxins				
Dioxins/Furans	6.72	9.75E-04	3.41E-02	1.32E-01

Uptake factors for organics were estimated using regression equations presented in McKone (1994); uptake factors for metals are from Baes et al. (1984) and Stevens (1992), as cited in Rust E&I, 1996. Dry-to-wet weight conversion factors of 0.07 for leafy vegetables and 0.22 for tubers and fruits (Baes et al., 1984) are included in the vegetable uptake factors for metals.

Kp(leafy) Soil-to-vegetation uptake factor for leafy vegetables.
Kp(roots) Soil-to-vegetation uptake factor for tubers/fruits
Bb Feed-to-beef uptake factor
VOCs Volatile organic compounds
BNAEs Base, neutral, and acid extractable compounds
Log Kow Octanol-water partition coefficient
NC Not calculated
-- Not available

TABLE K-1

VEGETABLE AND BEEF UPTAKE FACTORS

Compound	Log Kow (unitless)	$Kp_{(leafy)}$ (unitless)	$Kp_{(roots)}$ (unitless)	Bb (day/kg)
Inorganics				
Antimony	--	1.40E-02	6.60E-03	1.00E-03
Arsenic	--	2.80E-03	1.32E-03	1.30E-03
Barium	--	1.05E-02	3.30E-03	1.50E-04
Beryllium	--	7.00E-04	3.30E-04	1.00E-03
Cadmium	--	3.85E-02	3.30E-02	1.70E-04
Chromium (VI)	--	5.25E-04	9.90E-04	1.90E-03
Chromium (III)	--	5.25E-04	9.90E-04	1.90E-03
Cobalt	--	--	--	--
Copper	--	2.80E-02	5.50E-02	1.00E-02
Cyanide	--	--	--	--
Lead	--	3.15E-03	1.98E-03	6.70E-05
Manganese	--	1.75E-02	1.10E-02	4.00E-04
Mercury	--	6.30E-03	4.40E-03	3.50E-04
Nickel	--	4.20E-04	1.10E-02	2.00E-03
Selenium	--	--	--	--
Silver	--	--	--	--
Thallium	--	2.80E-04	8.80E-05	4.00E-02
Tin	--	--	--	--
Vanadium	--	--	--	--
Zinc	--	--	--	1.00E-01

Uptake factors for organics were estimated using regression equations presented in McKone (1994); uptake factors for metals are from Baes et al. (1984) and Stevens (1992), as cited in Rust E&I, 1996. Dry-to-wet weight conversion factors of 0.07 for leafy vegetables and 0.22 for tubers and fruits (Baes et al., 1984) are included in the vegetable uptake factors for metals.

Kp(leafy) Soil-to-vegetation uptake factor for leafy vegetables.
Kp(roots) Soil-to-vegetation uptake factor for tubers/fruits
Bb Feed-to-beef uptake factor
VOCs Volatile organic compounds
BNAEs Base, neutral, and acid extractable compounds
Log Kow Octanol-water partition coefficient
NC Not calculated
-- Not available

Child intake of contaminated beef from cattle raised at SWMU 1

CB	=	Modeled Value
IR	=	0.082 kg/day (USDA, 1982; USEPA, 1991)
FI	=	0.88 (McKone, 1994)
EF	=	350 days/year (USEPA, 1991)
ED	=	6 years (USEPA, 1991)
BW	=	15 kg (USEPA, 1991)
AT	=	365 days/year x 70 years (carcinogenic effects) 365 days/year x ED (noncarcinogenic effects)

Cattle were assumed to take up chemicals from soil and forage. The concentration of a chemical in forage was estimated using the same model that was used to estimate uptake into leafy vegetables. The concentration of a chemical in beef was estimated using the following equation:

$$CB = B_b [(CS \times IR_{c\text{-}s}) + (CS \times K_p \times IR_{c\text{-}f})] \times R_A$$

where:

CB	=	Chemical Concentration in Beef (mg/kg)
CS	=	Chemical Concentration in Soil (mg/kg)
B_b	=	Feed-to-Beef Transfer Factor (day/kg)
$IR_{c\text{-}s}$	=	Cattle Soil Ingestion Rate (kg/day)
K_p	=	Soil-to-Vegetation Uptake Factor (unitless)
$IR_{c\text{-}f}$	=	Cattle Forage Ingestion Rate (kg/day)
R_A	=	Ratio of SWMU Area to Entire Grazing Allotment Area (unitless)

and

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
B_b	=	Chemical specific (Table K-1)
$IR_{c\text{-}s}$	=	0.3 kg/day (Rust E&I; 1996)
Kp	=	Chemical specific (Table K-1)
$IR_{c\text{-}f}$	=	12 kg/day (USEPA, 1990)
R_A	=	Site specific (Area of grazing allotment: 161,900,000 m^2; Area of SWMU 1: 35,900 m^2)

The grazing allotment area was obtained from the Bureau of Land Management. SWMU-specific areas were estimated from data collected during the field investigation.

FUTURE EXPOSURE

Intake of current adults of contaminated beef from cattle raised at SWMUs 1, 1b, 1c, 1d, 20, 21, 34, 37, 42, 45, 48

CB	=	Modeled Value
IR	=	0.082 kg/day (USEPA, 1991)
FI	=	0.88 (McKone, 1994)
EF	=	350 days/year (USEPA, 1991)
ED	=	24 years (USEPA, 1991)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x 70 years (carcinogenic effects)

Intake of current children of contaminated beef from cattle raised at SWMUs 1, 1b, 1c, 1d, 20, 21, 34, 37, 42, 45, 48

CB	=	Modeled Value
IR	=	0.082 kg/day (USDA, 1982; USEPA, 1991)
FI	=	0.88 (McKone, 1994)
EF	=	350 days/year (USEPA, 1991)
ED	=	6 years (USEPA, 1991)
BW	=	15 kg (USEPA, 1991)
AT	=	365 days/year x 70 years (carcinogenic effects) 365 days/year x ED (noncarcinogenic effects)

Concentration of a chemical in beef from soil and forage at SWMUs 1 1b, 1c, 1d, 20, 21, 34, 37, 42, 45, 48

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
B_b	=	Chemical specific (Table K-1)
IR_{c-s}	=	0.3 kg/day (Rust E&I; 1996)
Kp	=	Chemical specific (Table K-1)
IR_{c-f}	=	12 kg/day (USEPA, 1990)
R_A	=	Site specific (Area of grazing allotment: 161,900,000m^2; Area of SWMUs: 1 - 35,900 m^2, 1b - 43,200 m^2, 1c - 178,000 m^2,1d - 21,800 m^2, 20 - 35,900 m^2, 21 - 5,810 m^2, 34 - 1,450 m^2, 37 - 131,000 m^2, 42 - 283,000 m^2, 45 - 7,350 m^2, 48 - 784 m^2)

At SWMU 45, cattle were also assumed to take up chemicals from surface water:

$$CB = B_b [(CS \times IR_{c-s}) + (CW \times IR_{c-w} \times CF) + (CS \times K_p \times IR_{c-f})] \times R_A$$

where:

CW	=	Chemical concentration in surface water (µg/L)
Ir_{c-w}	-	Cattle surface water ingestion rate (L/day)
CF	=	Conversion Factor (mg/µg)

and

CW	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (µg/L)
Ir_{c-w}	=	32 L/day (Large Animal Veterinary Science, University of Minnesota, 1988)
CF	=	10^{-3} mg/µg

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Central Tendency Exposure (CTE) Parameters Used in Risk Calculations

1. INTAKE OF CONTAMINATED SOIL BY INGESTION

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

where:

CS	=	Chemical Concentration in Soil (mg/kg)
IR	=	Ingestion Rate (mg-soil/day)
CF	=	Units Conversion Factor (kg/mg)
FI	=	Fraction Ingested from Contaminated Source (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

CURRENT EXPOSURES

Intake of contaminated soil by ingestion for Depot personnel at SWMUs 1 and 37.

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
IR	=	SWMU 1 : 135 mg/day (see explanation below) SWMU 37: 25 mg/day (DTSC, 1992)
CF	=	10^{-6} kg/mg
FI	=	1
EF	=	SWMU 1: 150 days/year based on 219 days per year adjusted for 8 months of operations (March through October, Snyder, 1994). SWMU 37: 219 days/year (USEPA, 1993)
ED	=	5 years (USEPA, 1993)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

The workers at SWMU 1 excavate pits as part of their duties and have similar exposures to soil as a construction worker. The default ingestion rate for soil for a construction worker is 480 milligrams per day (USEPA, 1991). This value is derived in part from an unvalidated soil adherence rate of 3.5 mg/cm^2. More recent studies have shown 1.0 mg/cm^2 is a more appropriate adherence rate (USEPA, 1992), and therefore the soil ingestion rate is likely overestimated by a factor of 3.5. The ingestion rate of 135 milligrams per day is derived by dividing 480 milligrams per day by 3.5.

FUTURE EXPOSURES

Intake of contaminated soil by ingestion for Depot personnel in the future at SWMU 34

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
IR	=	25 mg/day (DTSC, 1992)
CF	=	10^{-6} kg/mg
FI	=	1
EF	=	219 days/year (USEPA, 1993)
ED	=	5 years (USEPA, 1993)
BW	=	70 kg (USEPA, 1991)

AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

Intake of contaminated soil by ingestion for construction workers assuming one year project at SWMUs 1, 34, and 42

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
IR	=	135 mg/day based on rationale for SWMU 1 Depot worker
CF	=	10^{-6} kg/mg
FI	=	1
EF	=	125 days/year, based on best professional judgment assuming that the intrusive construction activities (as compared to non-intrusive activities such as framing, wiring, painting, etc.) last for six months
ED	=	1 year
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

2. INTAKE FROM DERMAL CONTACT WITH CONTAMINATED SOIL

$$\textbf{Intake (mg/kg-day)} = \frac{\textbf{CS x CF x SA x AF x ABS x EF x ED}}{\textbf{BW x AT}}$$

CS	=	Chemical Concentration in Soil (mg/kg)
CF	=	Conversion Factor (kg/mg)
SA	=	Skin Surface Area Available for Contact (cm^2)
AF	=	Soil to Skin Adherence factor (mg/cm^2)
ABS	=	Absorption Factor (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (days)

CURRENT EXPOSURE

Intake of Depot personnel from dermal contact at SWMUs 1 and 37

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg
SA	=	3,800 cm^2, assumes short sleeves, long pants, and shoes (USEPA, 1992)
AF	=	0.2 mg/cm^2, sandy silt soil (USEPA, 1992)
ABS	=	Contaminant specific: 0.1% for metals; 3% for organics (USEPA, 1992)
EF	=	SWMU 1: 150 days/year based on 219 days per year adjusted for 8 months of operations (March through October, Snyder, 1994). SWMU 37: 110/days/year, based on six months per year of unfrozen, snow-free ground where people wear the clothing specified above (one half of default 219 days/year, USEPA, 1993)
ED	=	5 years (USEPA, 1993)

BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

FUTURE EXPOSURE

Intake of Depot personnel in the future for dermal contact at SWMU 34

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg
SA	=	3,800 cm^2, assumes short sleeves, long pants, and shoes (USEPA, 1992)
AF	=	0.2 mg/cm^2, sandy silt soil (USEPA, 1992)
ABS	=	Contaminant specific: 0.1% for metals; 3% for organics (USEPA, 1992)
EF	=	110/days/year, based on six months per year of unfrozen, snow-free ground where people wear the clothing specified above (one half of default 219 days/year, USEPA, 1993)
ED	=	5 years (USEPA, 1993)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

Intake of future construction workers from dermal contact at SWMUs 1, 34, and 42

CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg
SA	=	3,800 cm^2, assumes short sleeves, long pants, and shoes (USEPA, 1992)
AF	=	0.2 mg/cm^2, sandy silt soil (USEPA, 1992)
ABS	=	Contaminant specific: 0.1% for metals; 3% for organics (USEPA, 1992)
EF	=	125 days/year based on six months per year of unfrozen, snow-free ground (one-half of default value of 250 days/year, USEPA, 1991)
ED	=	1 year
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

3. INTAKE FROM INHALATION OF CONTAMINATED PARTICULATES

$$\text{Intake (mg/kg-day)} = \frac{CA \times CS \times CF \times IR \times ET \times EF \times ED}{BW \times AT}$$

where:

CA	=	Concentration of Dust in Air (mg/m^3)
CS	=	Chemical Concentration in Soil (mg/kg)
CF	=	Unit Conversion factor (kg/mg)
IR	=	Inhalation rate(m^3/hour or m^3/day)
ET	=	Exposure time (hours/day or days/day)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)

BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

CURRENT EXPOSURE

Inhalation of contaminated particulates by Depot personnel at SWMUs 1 and 37

CA	=	SWMU 1: 0.4 mg/m^3 based on dust monitoring during excavation activities at SWMU 1 SWMU 37: 0.0002 mg/m^3 (USEPA, 1991b)
CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg
IR	=	2.5 m^3/hour (USEPA, 1989)
ET	=	SWMU 1: 3 hours/day based on time spent in dust generating activities at SWMU 1 (Snyder, 1994) SWMUs 37: 8 hours/day (USEPA, 1989)
EF	=	SWMU 1: 150 days/year based on 219 days per year adjusted for 8 months of operations (March through October, Snyder, 1994). SWMU 37: 110 days/year based on six months per year of unfrozen, snow-free ground (one-half of default value of 219 days/year, USEPA, 1993)
ED	=	5 years (USEPA, 1993)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

FUTURE EXPOSURE

Inhalation of contaminated particulates by future Depot personnel at SWMU 34

CA	=	0.0002 mg/m^3, USEPA ambient air quality standard for respirable dust
CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg
IR	=	2.5 m^3/hour (USEPA, 1991)
ET	=	8 hours/day (USEPA, 1989)
EF	=	110 days/year based on six months per year of unfrozen, snow-free ground (one-half of default value of 219 days/year, USEPA, 1993)
ED	=	5 years (USEPA, 1993)
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

Inhalation of contaminated particulates by construction workers at SWMUs 1, 34, and 42

CA	=	0.4 mg/m^3 based on dust monitoring during excavation activities at SWMU 1
CS	=	Lesser of 95 percent upper confidence limit of the mean or maximum detected value (mg/kg)
CF	=	10^{-6} kg/mg
IR	=	2.5 m^3/hour (USEPA, 1991)

ET	=	8 hours/day (USEPA, 1989)
EF	=	125 days/year based on six months per year of unfrozen, snow-free ground (one-half of default value of 250 days/year, USEPA, 1991)
ED	=	1 year,
BW	=	70 kg (USEPA, 1991)
AT	=	365 days/year x ED (noncarcinogenic effects) 365 days/year x 70 years (carcinogenic effects)

4. LEAD UPTAKE MODELING

Lead uptake modeling was performed identically to the RME scenario. However, 50th percentile results are reported instead of 95th percentile results.

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SECTION K-2

SWMU-SPECIFIC RME AND CTE RISK ASSESSMENT CALCULATIONS

SWMU 1

TOXICITY INDICIES SCREEN FOR SELECTION OF COPCs
SWMU 1 - MAIN DEMOLITION AREA

Compound	Maximum Concentration mg/kg	Percent of Detects	Chronic Oral RfD	Non-carcinogenic Index	Percent of Total	Oral Slope Factor	Carcinogenic Index	Percent of Total	Comments
2,4,6-Trinitrotoluene	1.10E+04	12	5.00E-04	**2.20E+07**	52.6	3.00E-02	**3.30E+02**	53.6	
1,3-Dinitrobenzene	9.10E+02	2	1.00E-04	**9.10E+06**	21.8				
Antimony	2.20E+03	9	4.00E-04	**5.50E+06**	13.1				
1,3,5-Trinitrobenzene	1.10E+02	5	5.00E-05	**2.20E+06**	5.3				
Thallium	1.10E+02	24	8.00E-05	**1.38E+06**	3.3				
Cyclonite (RDX)	2.00E+03	25	3.00E-03	**6.67E+05**	1.6	1.10E-01	**2.20E+02**	35.7	
Barium	2.20E+04	100	7.00E-02	**3.14E+05**	0.8				
Zinc	6.90E+04	100	3.00E-01	**2.30E+05**	0.5				
Cadmium	2.03E+02	48	1.00E-03	**2.03E+05**	0.5				
Arsenic	2.90E+01	98	3.00E-04	9.67E+04	0.23	1.80E+00	**5.22E+01**	8.5	
Chromium	4.80E+02	95	5.00E-03	9.60E+04	0.23				Carcinogen by inhalation
Nickel	2.20E+02	100	2.00E-02	1.10E+04	0.03				
Manganese	1.50E+03	100	1.40E-01	**1.07E+04**	0.03				More toxic by inhalation
2,4-Dinitrotoluene	1.52E+01	5	2.00E-03	7.60E+03	0.02	6.80E-01	**1.03E+01**	1.7	
Vanadium	4.54E+01	98	7.00E-03	6.49E+03	0.02				
2,6-Dinitrotoluene	4.96E+00	2	1.00E-03	4.96E+03	0.01	6.80E-01	3.37E+00	0.5	
Cyclotetramethylenetetranitramine (HMX	1.90E+02	9	5.00E-02	3.80E+03	0.009				
Silver	8.67E+00	12	5.00E-03	1.73E+03	0.004				
Mercury	3.80E-01	31	3.00E-04	**1.27E+03**	0.003				More toxic by inhalation
Phenanthrene	1.00E+01	24	3.00E-02	3.33E+02	0.001				
Cyanide	6.29E+00	15	2.00E-02	3.15E+02	0.001				
Fluorene	5.00E+00	5	4.00E-02	1.25E+02	0.0003				
Acenaphthene	5.00E+00	5	6.00E-02	8.33E+01	0.0002				
2-Methylnaphthalene	7.00E-01	5	3.00E-02	2.33E+01	0.0001				
Napthalene	4.00E-01	14	3.00E-02	1.33E+01	0.00003				
Pyrene	3.00E-01	10	3.00E-02	1.00E+01	0.00002				
Acetone	6.10E-02	6	1.00E-01	6.10E-01	0.000001				
Methylene chloride	1.40E-02	6	6.00E-02	2.33E-01	0.000001	7.50E-03	1.05E-04	0.00002	
Tetrachloroethene	2.00E-03	6	1.00E-02	2.00E-01	0.0000005	5.10E-02	1.02E-04	0.00002	
Ethylbenzene	5.00E-03	11	1.00E-01	5.00E-02	0.0000001				
Toluene	3.00E-03	11	2.00E-01	1.50E-02	0.00000004				
Xylenes	2.80E-02	11	2.00E+00	1.40E-02	0.00000003				
Aluminum	2.60E+05	100							
Cobalt	6.10E+01	89							
Copper	1.00E+05	100							
Lead	6.80E+04	100							
n-Nitrosodiphenylamine	2.00E+00	5							
Nitramine (Tetryl)	8.14E-01	1							
Nitrobenzene	7.80E+01	2							
Selenium	2.50E+00	3							

Total noncarcinogenic index: 4.18E+07
Total noncarcinogenic index for COPCs: 4.16E+07

Total carcinogenic index: 6.16E+02
Total carcinogenic index for COPCs: 6.13E+02

Contaminants of potential concern (COPCs) are in bold and underlined.

RfD Reference dose

TEAD-N, SWMU 1 - MAIN DEMOLITION AREA

RME RISK CALCULATIONS FOR DEPOT PERSONNEL

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg/day)	Lifetime Average Dermal Dose (mg/kg/day)	Lifetime Average Inhalation Dose (mg/kg/day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Cadmium	1.4E+01	1.5E-05	1.4E-07	2.4E-07	NA	NA	6.3E+00	NC	NC	1.5E-06	2E-06
Chromium (VI)	7.8E-01	8.9E-07	8.0E-09	1.4E-08	NA	NA	4.1E+01	NC	NC	5.7E-07	6E-07
2,4,6-Trinitrotoluene	6.9E+02	7.8E-04	2.1E-04	1.2E-05	3.0E-02	3.8E-02	NA	2.4E-05	7.9E-06	NC	3E-05
Cyclonite (RDX)	1.1E+02	1.3E-04	3.4E-05	2.0E-06	1.1E-01	3.7E-01	NA	1.4E-05	1.2E-05	NC	3E-05
							Total Cancer Risk:	4E-05	2E-05	2E-06	6E-05

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg/day)	Chronic Dermal Dose (mg/kg/day)	Chronic Inhalation Dose (mg/kg/day)	Oral RfD	Dermal RfD	Inhalation RfD	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Antimony	1.3E+01	4.0E-05	3.6E-07	6.3E-07	4.0E-04	4.0E-06	NA	1.0E-01	9.1E-02	NC	2E-01
Barium	2.6E+02	8.3E-04	7.5E-06	1.3E-05	7.0E-02	3.5E-03	1.0E-04	1.2E-02	2.1E-03	1.3E-01	1E-01
Cadmium	1.4E+01	4.3E-05	3.9E-07	6.8E-07	1.0E-03	7.0E-05	NA	4.3E-02	5.5E-03	NC	5E-02
Chromium (VI)	7.8E-01	2.5E-06	2.2E-08	3.9E-08	5.0E-03	5.5E-04	NA	5.0E-04	4.1E-05	NC	5E-04
Chromium (III)	1.5E+01	4.7E-05	4.2E-07	7.4E-07	1.0E+00	4.0E-02	NA	4.7E-05	1.1E-05	NC	6E-05
Lead	3.4E+03	1.1E-02	9.8E-05	1.7E-04	NA	0.0E+00	NA	NA	NA	NA	NA
Manganese	3.1E+02	1.0E-03	9.0E-06	1.6E-05	1.4E-01	4.2E-03	1.4E-05	7.2E-03	2.1E-03	1.1E+00	1E+00
Mercury	9.5E-02	3.0E-07	2.7E-09	4.7E-09	3.0E-04	4.5E-05	8.6E-05	1.0E-03	6.0E-05	5.5E-05	1E-03
Thallium	9.0E+00	2.9E-05	2.6E-07	4.5E-07	8.0E-05	8.0E-05	NA	3.6E-01	3.2E-03	NC	4E-01
Zinc	4.5E+03	1.4E-02	1.3E-04	2.3E-04	3.0E-01	9.0E-02	NA	4.8E-02	1.4E-03	NC	5E-02
1,3,5-Trinitrobenzene	9.3E+00	3.0E-05	8.0E-06	4.6E-07	5.0E-05	4.0E-05	NA	5.9E-01	2.0E-01	NC	8E-01
1,3-Dinitrobenzene	4.0E+01	1.3E-04	3.4E-05	2.0E-06	1.0E-04	8.0E-05	NA	1.3E+00	4.3E-01	NC	2E+00
2,4,6-Trinitrotoluene	6.9E+02	2.2E-03	5.9E-04	3.4E-05	5.0E-04	4.0E-04	NA	4.4E+00	1.5E+00	NC	6E+00
Cyclonite (RDX)	1.1E+02	3.5E-04	9.5E-05	5.5E-06	3.0E-03	9.0E-04	NA	1.2E-01	1.1E-01	NC	2E-01
							Total Hazard Index:	7E+00	2E+00	1E+00	1E+01

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 1 - MAIN DEMOLITION AREA

CTE RISK CALCULATIONS FOR DEPOT PERSONNEL

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg/day)	Lifetime Average Dermal Dose (mg/kg/day)	Lifetime Average Inhalation Dose (mg/kg/day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Cadmium	1.4E+01	7.7E-07	4.3E-09	1.7E-08	NA	NA	6.3E+00	NC	NC	1.1E-07	1E-07
Chromium (VI)	7.8E-01	4.4E-08	2.5E-10	9.8E-10	NA	NA	4.1E+01	NC	NC	4.0E-08	4E-08
2,4,6-Trinitrotoluene	6.9E+02	3.9E-05	6.6E-06	8.7E-07	3.0E-02	3.8E-02	NA	1.2E-06	2.5E-07	NC	1E-06
Cyclonite (RDX)	1.1E+02	6.3E-06	1.1E-06	1.4E-07	1.1E-01	3.7E-01	NA	6.9E-07	3.9E-07	NC	1E-06
							Total Cancer Risk:	2E-06	6E-07	1E-07	3E-06

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg/day)	Chronic Dermal Dose (mg/kg/day)	Chronic Inhalation Dose (mg/kg/day)	Oral RfD	Dermal RfD	Inhalation RfD	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Antimony	1.3E+01	1.0E-05	5.7E-08	2.2E-07	4.0E-04	4.0E-06	NA	2.5E-02	1.4E-02	NC	4E-02
Barium	2.6E+02	2.1E-04	1.2E-06	4.6E-06	7.0E-02	3.5E-03	1.0E-04	3.0E-03	3.3E-04	4.6E-02	5E-02
Cadmium	1.4E+01	1.1E-05	6.0E-08	2.4E-07	1.0E-03	7.0E-05	NA	1.1E-02	8.6E-04	NC	1E-02
Chromium (VI)	7.8E-01	6.2E-07	3.5E-09	1.4E-08	5.0E-03	5.5E-04	NA	1.2E-04	6.3E-06	NC	1E-04
Chromium (III)	1.5E+01	1.2E-05	6.6E-08	2.6E-07	1.0E+00	4.0E-02	NA	1.2E-05	1.7E-06	NC	1E-05
Lead	3.4E+03	2.7E-03	1.5E-05	6.0E-05	NA	0.0E+00	NA	NA	NA	NA	NA
Manganese	3.1E+02	2.5E-04	1.4E-06	5.5E-06	1.4E-01	4.2E-03	1.4E-05	1.8E-03	3.3E-04	3.9E-01	4E-01
Mercury	9.5E-02	7.5E-08	4.2E-10	1.7E-09	3.0E-04	4.5E-05	8.6E-05	2.5E-04	9.4E-06	1.9E-05	3E-04
Thallium	9.0E+00	7.1E-06	4.0E-08	1.6E-07	8.0E-05	8.0E-05	NA	8.9E-02	5.0E-04	NC	9E-02
Zinc	4.5E+03	3.6E-03	2.0E-05	8.0E-05	3.0E-01	9.0E-02	NA	1.2E-02	2.2E-04	NC	1E-02
1,3,5-Trinitrobenzene	9.3E+00	7.3E-06	1.2E-06	1.6E-07	5.0E-05	4.0E-05	NA	1.5E-01	3.1E-02	NC	2E-01
1,3-Dinitrobenzene	4.0E+01	3.2E-05	5.4E-06	7.1E-07	1.0E-04	8.0E-05	NA	3.2E-01	6.7E-02	NC	4E-01
2,4,6-Trinitrotoluene	6.9E+02	5.5E-04	9.2E-05	1.2E-05	5.0E-04	4.0E-04	NA	1.1E+00	2.3E-01	NC	1E+00
Cyclonite (RDX)	1.1E+02	8.8E-05	1.5E-05	1.9E-06	3.0E-03	9.0E-04	NA	2.9E-02	1.6E-02	NC	5E-02
							Total Hazard Index:	2E+00	4E-01	4E-01	3E+00

NA Not applicable
NC Not calculated
CTE Central tendency exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 1 - MAIN DEMOLITION AREA

RISK CALCULATIONS FOR CURRENT RESIDENTS

Chemical	RME Concentration (mg/kg)	Lifetime Average Inhalation Dose (mg/kg/day)			Inhalation Slope Factor	Inhalation Cancer Risk		
		Grantsville	Stockton	Depot Housing		Grantsville	Stockton	Depot Housing
Cadmium	1.7E+01	1.1E-09	5.0E-10	1.5E-10	6.3E+00	6.8E-09	3.2E-09	9.5E-10
					Total Cancer Risk:	7E-09	3E-09	9E-10

Chemical	RME Concentration (mg/kg)	Chronic Daily Inhalation Dose (mg/kg/day)			Inhalation RfD	Inhalation Hazard Quotient		
		Grantsville	Stockton	Depot Housing		Grantsville	Stockton	Depot Housing
Barium	2.8E+02	1.1E-07	5.1E-08	3.5E-08	1.0E-04	1.1E-03	5.1E-04	3.5E-04
Lead	4.8E+03	1.8E-06	8.6E-07	6.0E-07	NA	NC	NC	NC
Manganese	3.4E+02	1.3E-07	6.1E-08	4.2E-08	1.4E-05	9.2E-03	4.3E-03	3.0E-03
Mercury	8.6E-02	3.3E-11	1.5E-11	1.1E-11	8.6E-05	3.8E-07	1.8E-07	1.2E-07
					Total Hazard Index:	1E-02	5E-03	3E-03

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 1 - MAIN DEMOLITION AREA

RME RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg/day)	Lifetime Average Dermal Dose (mg/kg/day)	Lifetime Average Inhalation Dose (mg/kg/day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Arsenic	6.8E+00	2.3E-07	2.0E-09	9.4E-09	1.8E+00	1.8E+00	1.5E+01	4.1E-07	3.7E-09	1.4E-07	6E-07
Cadmium	7.4E+00	2.5E-07	2.2E-09	1.0E-08	NA	NA	6.3E+00	NC	NC	6.5E-08	6E-08
Chromium (VI)	1.3E+00	4.4E-08	3.9E-10	1.8E-09	NA	NA	4.1E+01	NC	NC	7.5E-08	7E-08
2,4,6-Trinitrotoluene	2.2E+02	7.3E-06	2.0E-06	3.1E-07	3.0E-02	3.8E-02	NA	2.2E-07	7.4E-08	NC	3E-07
Cyclonite (RDX)	3.7E+01	1.2E-06	3.3E-07	5.2E-08	1.1E-01	3.7E-01	NA	1.4E-07	1.2E-07	NC	3E-07
							Total Cancer Risk:	8E-07	2E-07	3E-07	1E-06

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg/day)	Chronic Dermal Dose (mg/kg/day)	Chronic Inhalation Dose (mg/kg/day)	Subchronic Oral RfD	Subchronic Dermal RfD	Subchronic Inhalation RfD	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Antimony	5.9E+01	1.4E-04	1.2E-06	5.8E-06	4.0E-04	4.0E-06	NA	3.5E-01	3.1E-01	NC	7E-01
Arsenic	6.8E+00	1.6E-05	1.4E-07	6.6E-07	3.0E-04	3.0E-04	NA	5.3E-02	4.7E-04	NC	5E-02
Barium	7.3E+02	1.7E-03	1.5E-05	7.1E-05	7.0E-02	3.5E-03	1.0E-03	2.4E-02	4.4E-03	7.1E-02	1E-01
Cadmium	7.4E+00	1.7E-05	1.5E-07	7.2E-07	1.0E-03	7.0E-05	NA	1.7E-02	2.2E-03	NC	2E-02
Chromium (VI)	1.3E+00	3.1E-06	2.8E-08	1.3E-07	2.0E-02	2.2E-03	NA	1.5E-04	1.3E-05	NC	2E-04
Chromium (III)	2.5E+01	5.8E-05	5.2E-07	2.4E-06	1.0E+00	4.0E-02	NA	5.8E-05	1.3E-05	NC	7E-05
Lead	2.3E+03	5.4E-03	4.9E-05	2.3E-04	NA	NA	NA	NC	NC	NC	NA
Manganese	3.7E+02	8.7E-04	7.8E-06	3.6E-05	1.4E-01	4.2E-03	1.4E-05	6.2E-03	1.9E-03	2.5E+00	3E+00
Mercury	5.8E-02	1.4E-07	1.2E-09	5.6E-09	3.0E-04	4.5E-05	8.6E-05	4.5E-04	2.7E-05	6.6E-05	5E-04
Thallium	9.1E+00	2.1E-05	1.9E-07	8.9E-07	8.0E-04	8.0E-04	NA	2.7E-02	2.4E-04	NC	3E-02
Zinc	1.9E+03	4.5E-03	4.0E-05	1.9E-04	3.0E-01	9.0E-02	NA	1.5E-02	4.4E-04	NC	2E-02
1,3,5-Trinitrobenzene	3.2E+00	7.4E-06	2.0E-06	3.1E-07	5.0E-05	4.0E-05	NA	1.5E-01	5.0E-02	NC	2E-01
1,3-Dinitrobenzene	1.3E+01	3.0E-05	8.0E-06	1.2E-06	1.0E-03	8.0E-04	NA	3.0E-02	1.0E-02	NC	4E-02
2,4,6-Trinitrotoluene	2.2E+02	5.1E-04	1.4E-04	2.1E-05	5.0E-04	4.0E-04	NA	1.0E+00	3.4E-01	NC	1E+00
Cyclonite (RDX)	3.7E+01	8.7E-05	2.3E-05	3.6E-06	3.0E-03	9.0E-04	NA	2.9E-02	2.6E-02	NC	5E-02
							Total Hazard Index:	1.7E+00	7.5E-01	2.6E+00	5E+00

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 1 - MAIN DEMOLITION AREA

CTE RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg/day)	Lifetime Average Dermal Dose (mg/kg/day)	Lifetime Average Inhalation Dose (mg/kg/day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Arsenic	6.8E+00	6.4E-08	3.6E-10	3.8E-09	1.8E+00	1.8E+00	1.5E+01	1.1E-07	6.5E-10	5.7E-08	2E-07
Cadmium	7.4E+00	6.9E-08	3.9E-10	4.1E-09	NA	NA	6.3E+00	NC	NC	2.6E-08	3E-08
Chromium (VI)	1.3E+00	1.2E-08	7.0E-11	7.3E-10	NA	NA	4.1E+01	NC	NC	3.0E-08	3E-08
2,4,6-Trinitrotoluene	2.2E+02	2.1E-06	3.5E-07	1.2E-07	3.0E-02	3.8E-02	NA	6.2E-08	1.3E-08	NC	7E-08
Cyclonite (RDX)	3.7E+01	3.5E-07	5.9E-08	2.1E-08	1.1E-01	3.7E-01	NA	3.8E-08	2.2E-08	NC	6E-08
							Total Cancer Risk:	2E-07	4E-08	1E-07	4E-07

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg/day)	Chronic Dermal Dose (mg/kg/day)	Chronic Inhalation Dose (mg/kg/day)	Subchronic Oral RfD	Subchronic Dermal RfD	Subchronic Inhalation RfD	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Antimony	5.9E+01	3.9E-05	2.2E-07	2.3E-06	4.0E-04	4.0E-06	NA	9.7E-02	5.5E-02	NC	2E-01
Arsenic	6.8E+00	4.5E-06	2.5E-08	2.6E-07	3.0E-04	3.0E-04	NA	1.5E-02	8.4E-05	NC	1E-02
Barium	7.3E+02	4.8E-04	2.7E-06	2.9E-05	7.0E-02	3.5E-03	1.0E-03	6.9E-03	7.7E-04	2.9E-02	4E-02
Cadmium	7.4E+00	4.9E-06	2.7E-08	2.9E-07	1.0E-03	7.0E-05	NA	4.9E-03	3.9E-04	NC	5E-03
Chromium (VI)	1.3E+00	8.6E-07	4.9E-09	5.1E-08	2.0E-02	2.2E-03	NA	4.3E-05	2.2E-06	NC	5E-05
Chromium (III)	2.5E+01	1.6E-05	9.2E-08	9.7E-07	1.0E+00	4.0E-02	NA	1.6E-05	2.3E-06	NC	2E-05
Lead	2.3E+03	1.5E-03	8.6E-06	9.1E-05	NA	NA	NA	NC	NC	NC	NA
Manganese	3.7E+02	2.5E-04	1.4E-06	1.5E-05	1.4E-01	4.2E-03	1.4E-05	1.8E-03	3.3E-04	1.0E+00	1E+00
Mercury	5.8E-02	3.8E-08	2.1E-10	2.3E-09	3.0E-04	4.5E-05	8.6E-05	1.3E-04	4.8E-06	2.6E-05	2E-04
Thallium	9.1E+00	6.0E-06	3.4E-08	3.5E-07	8.0E-04	8.0E-04	NA	7.5E-03	4.2E-05	NC	8E-03
Zinc	1.9E+03	1.3E-03	7.1E-06	7.4E-05	3.0E-01	9.0E-02	NA	4.2E-03	7.9E-05	NC	4E-03
1,3,5-Trinitrobenzene	3.2E+00	2.1E-06	3.5E-07	1.2E-07	5.0E-05	4.0E-05	NA	4.2E-02	8.8E-03	NC	5E-02
1,3-Dinitrobenzene	1.3E+01	8.4E-06	1.4E-06	5.0E-07	1.0E-03	8.0E-04	NA	8.4E-03	1.8E-03	NC	1E-02
2,4,6-Trinitrotoluene	2.2E+02	1.4E-04	2.4E-05	8.6E-06	5.0E-04	4.0E-04	NA	2.9E-01	6.1E-02	NC	3E-01
Cyclonite (RDX)	3.7E+01	2.4E-05	4.1E-06	1.5E-06	3.0E-03	9.0E-04	NA	8.2E-03	4.6E-03	NC	1E-02
							Total Hazard Index:	4.8E-01	1.3E-01	1.0E+00	2E+00

NA Not applicable
NC Not calculated
CTE Central tendency exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 1 - MAIN DEMOLITION AREA

RME RISK CALCULATIONS FOR FUTURE TEAD-N RESIDENT

Chemical	Exposure Point Concentration (mg/kg)	Soil Lifetime Average Oral Dose (mg/kg-day)	Soil Lifetime Average Dermal Dose (mg/kg-day)	Soil Lifetime Average Inhalation Dose (mg/kg-day)	Produce Lifetime Average Oral Dose (mg/kg-day)	Beef Lifetime Average Oral Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Soil Ingestion Cancer Risk	Soil Dermal Cancer Risk	Soil Inhalation Cancer Risk	Produce Ingestion Cancer Risk	Beef Ingestion Cancer Risk	Total Cancer Risk
Cadmium	1.7E+01	2.6E-05	3.6E-07	8.4E-08	8.3E-04	1.7E-08	NA	NA	6.3E+00	NC	NC	5.3E-07	NC	NC	5.3E-07
2,4,6-Trinitrotoluene	8.8E+02	1.4E-03	5.6E-04	4.4E-06	9.3E+00	7.7E-08	3.0E-02	3.8E-02	NA	4.1E-05	2.1E-05	NC	2.8E-01	2.3E-09	2.8E-01
Cyclonite (RDX)	5.2E+01	8.2E-05	3.4E-05	2.6E-07	1.5E+00	2.2E-09	1.1E-01	3.7E-01	NA	9.0E-06	1.2E-05	NC	1.6E-01	2.5E-10	1.6E-01
									Total Cancer Risk:	5E-05	3E-05	5E-07	4E-01	3E-09	4E-01

Chemical	Exposure Point Concentration (mg/kg)	Soil Chronic Oral Dose (mg/kg-day)	Soil Chronic Dermal Dose (mg/kg-day)	Soil Chronic Inhalation Dose (mg/kg-day)	Produce Chronic Oral Dose (mg/kg-day)	Beef Chronic Oral Dose (mg/kg-day)	Oral RfD	Dermal RfD	Inhalation RfD	Soil Ingestion Hazard Quotient	Soil Dermal Hazard Quotient	Soil Inhalation Hazard Quotient	Produce Ingestion Hazard Quotient	Beef Ingestion Hazard Quotient	Total Hazard Quotient
Antimony	1.6E+01	2.0E-04	1.4E-06	4.7E-07	1.4E-03	3.6E-07	4.0E-04	4.0E-06	NA	5.1E-01	3.4E-01	NC	3.4E+00	9.1E-04	4.3E+00
Barium	2.8E+02	3.6E-03	2.4E-05	8.4E-06	1.8E-02	8.9E-07	7.0E-02	3.5E-03	1.0E-04	5.2E-02	7.0E-03	8.4E-02	2.5E-01	1.3E-05	4.0E-01
Cadmium	1.7E+01	2.2E-04	1.4E-06	5.0E-07	4.4E-03	1.1E-07	1.0E-03	7.0E-05	NA	2.2E-01	2.1E-02	NC	4.4E+00	1.1E-04	4.7E+00
Lead	4.8E+03	6.2E-02	4.1E-04	1.4E-04	9.8E-02	5.3E-06	NA	NA	NA	NC	NC	NC	NC	NC	NC
Manganese	3.4E+02	4.3E-03	2.9E-05	1.0E-05	3.8E-02	3.4E-06	1.4E-01	4.2E-03	1.4E-05	3.1E-02	6.9E-03	7.0E-01	2.7E-01	2.4E-05	1.0E+00
Mercury	8.6E-02	1.1E-06	7.4E-09	2.5E-09	3.5E-06	5.5E-10	3.0E-04	4.5E-05	8.6E-05	3.7E-03	1.6E-04	3.0E-05	1.2E-02	1.8E-06	1.6E-02
Thallium	1.1E+01	1.4E-04	9.1E-07	3.1E-07	1.8E-05	6.3E-06	8.0E-05	8.0E-05	NA	1.7E+00	1.1E-02	NC	2.2E-01	7.8E-02	2.0E+00
Zinc	6.4E+03	8.2E-02	5.5E-04	1.9E-04	NC	9.3E-03	3.0E-01	9.0E-02	NA	2.7E-01	6.1E-03	NC	NC	3.1E-02	3.1E-01
1,3,5-Trinitrobenzene	1.1E+01	1.4E-04	2.7E-05	3.1E-07	1.0E+00	3.8E-09	5.0E-05	4.0E-05	NA	2.7E+00	6.8E-01	NC	2.1E+04	7.7E-05	2.1E+04
1,3-Dinitrobenzene	3.4E-01	4.3E-06	8.6E-07	1.0E-08	2.2E-02	1.7E-10	1.0E-04	8.0E-05	NA	4.3E-02	1.1E-02	NC	2.2E+02	1.7E-06	2.2E+02
2,4,6-Trinitrotoluene	8.8E+02	1.1E-02	2.3E-03	2.6E-05	5.0E+01	4.9E-07	5.0E-04	4.0E-04	NA	2.3E+01	5.7E+00	NC	9.9E+04	9.7E-04	9.9E+04
Cyclonite (RDX)	5.2E+01	6.7E-04	1.3E-04	1.6E-06	7.8E+00	1.4E-08	3.0E-03	9.0E-04	NA	2.2E-01	1.5E-01	NC	2.6E+03	4.7E-06	2.6E+03
									Total Hazard Index:	3E+01	7E+00	8E-01	1E+05	1E-01	1E+05

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 1 DEPOT WORKER

INPUT		OUTPUT					
MEDIUM	LEVEL		percentiles				
LEAD IN AIR (ug/m^3)	0.1		50th	90th	95th	98th	99th
LEAD IN SOIL (ug/g)	3421	BLOOD Pb, ADULT (µg/dL)	5.8	9.2	10.4	12.0	13.2
LEAD IN WATER (ug/l)	15						
PLANT UPTAKE? 1=YES 0=NO	0						
AIRBORNE DUST (ug/m^3)	50						

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	0.67	=	1E-04 (ug/dl)/(ug/day)	*	3421 ug/g	*	1.85 g soil/day (5 g/m^2 * 0.37 m^2)		11%
SOIL INGESTION:	3.01	=	0.018 (ug/dl)/(ug/day)	*	3421 ug/g	*	0.05 g soil/day		52%
INHALATION:	0.44	=	1.64 (ug/dl)/(ug/m^3)	*	0.27 ug/m^3				8%
WATER INGESTION:	0.84	=	0.04 (ug/dl)/(ug/day)	*	15 ug/l	*	1.4 l water/day		14%
FOOD INGESTION:	0.88	=	0.04 (ug/dl)/(ug/day)	*	10.0 ug Pb/kg diet	*	2.2 kg diet/day		15%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD	=	.945 * 10 + 0.055 * Pb in produce (ug/kg)	=	10.0	ug/kg
LEAD IN PRODUCE	=	10 ug/kg or 0.00045 * soil lead d	=	10.0	ug/kg

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 1 CONSTRUCTION WORKER

INPUT		OUTPUT					
MEDIUM	LEVEL			percentiles			
			50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.1						
LEAD IN SOIL (ug/g)	2394	BLOOD Pb, ADULT (µg/dL)	4.7	7.3	8.3	9.6	10.5
LEAD IN WATER (ug/l)	15						
PLANT UPTAKE? 1=YES 0=NO	0						
AIRBORNE DUST (ug/m^3)	50						

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	0.47	=	1E-04	(ug/dl)/(ug/day) *	2394	ug/g *	1.85	g soil/day (5 g/m^2 * 0.37 m^2)	10%
SOIL INGESTION:	2.11	=	0.018	(ug/dl)/(ug/day) *	2394	ug/g *	0.05	g soil/day	45%
INHALATION:	0.36	=	1.64	(ug/dl)/(ug/m^3) *	0.22	ug/m^3			8%
WATER INGESTION:	0.84	=	0.04	(ug/dl)/(ug/day) *	15	ug/l *	1.4	l water/day	18%
FOOD INGESTION:	0.88	=	0.04	(ug/dl)/(ug/day) *	10.0	ug Pb/kg diet *	2.2	kg diet/day	19%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD = .945 * 10 + 0.055 * Pb in produce (ug/kg) = 10.0 ug/kg

LEAD IN PRODUCE = 10 ug/kg or 0.00045 * soil lead d = 10.0 ug/kg

OUTPUT FROM EPA IEUBK LEAD 0.5 MODEL FOR CHILDREN (SWMU 1)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	2140.0	200.0
1-2	2140.0	200.0
2-3	2140.0	200.0
3-4	2140.0	200.0
4-5	2140.0	200.0
5-6	2140.0	200.0
6-7	2140.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

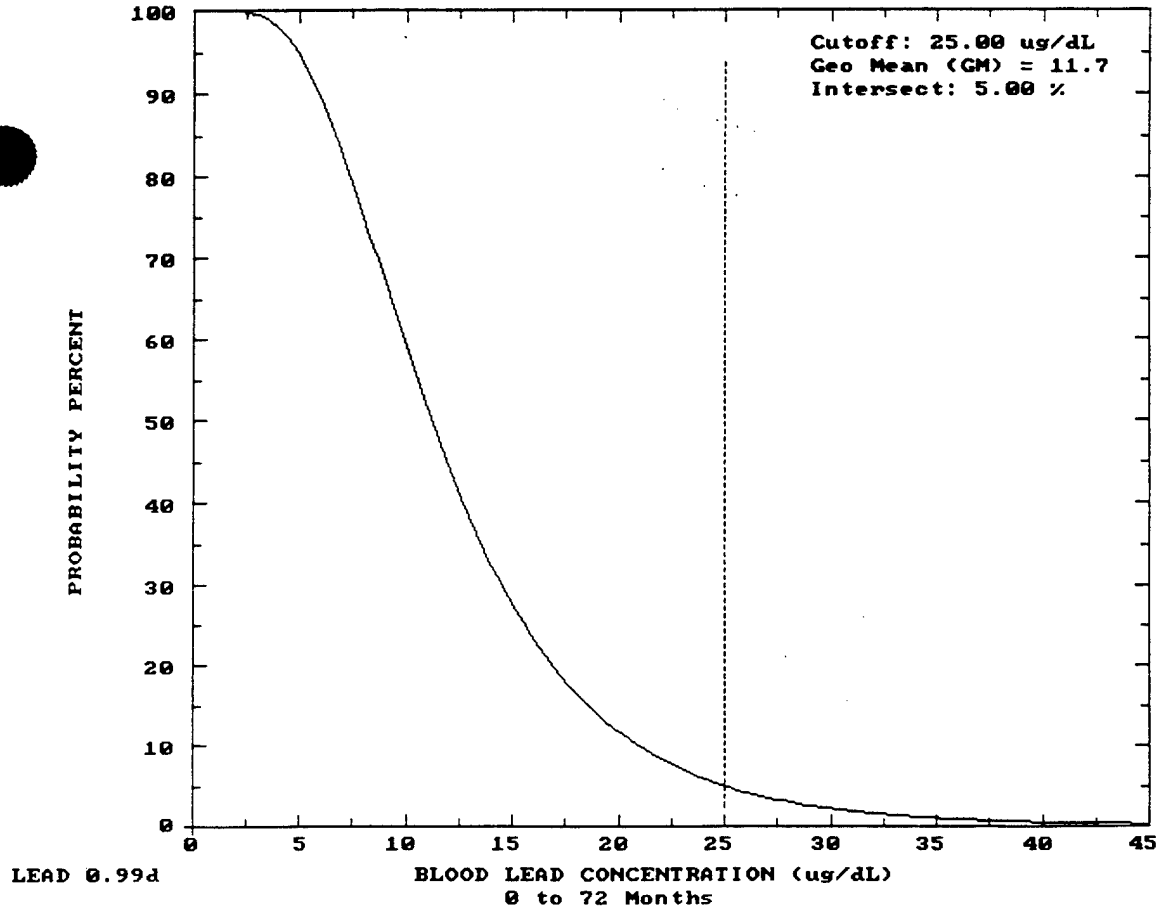
CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	12.1	23.24	20.81
1-2:	13.9	34.58	31.71
2-3:	13.2	36.17	32.87
3-4:	12.7	37.34	34.00
4-5:	10.7	30.63	27.11
5-6:	9.1	28.95	25.11
6-7:	8.1	28.29	24.07

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.10	0.30	0.00	0.02
1-2:	2.11	0.73	0.00	0.03
2-3:	2.45	0.79	0.00	0.06

3-4:	2.44	0.83	0.00	0.07
4-5:	2.53	0.93	0.00	0.07
5-6:	2.75	1.01	0.00	0.09
6-7:	3.08	1.04	0.00	0.09

3-4:	2.44	0.83	0.00	0.07
4-5:	2.53	0.93	0.00	0.07
5-6:	2.75	1.01	0.00	0.09
6-7:	3.08	1.04	0.00	0.09


Cutoff: 25.00 ug/dL
Geo Mean (GM) = 11.7
Intersect: 5.00 %
PROBABILITY PERCENT
100
90
80
70
60
50
40
30
20
10
0
0
5
10
15
20
25
30
35
40
45
LEAD 0.99d
BLOOD LEAD CONCENTRATION (ug/dL)
0 to 72 Months

SWMU 1b

SWMU 1b - BURN PAD

RME RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Dermal Slope Factor mg/kg-day)-	Inhalation Slope Factor (mg/kg-day)-1	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Chemical Cancer Risk
Cadmium	1.3E+01	4.2E-07	3.8E-09	1.8E-08	NA	NA	6.3E+00	NC	NC	1.1E-07	1.1E-07
Lead	6.8E+01	2.3E-06	2.0E-08	9.5E-08	NA	NA	NA	NC	NC	NC	NC
Silver	8.0E+00	2.7E-07	2.4E-09	1.1E-08	NA	NA	NA	NC	NC	NC	NC
Zinc	4.5E+02	1.5E-05	1.3E-07	6.3E-07	NA	NA	NA	NC	NC	NC	NC
RDX	5.0E-01	1.7E-08	4.5E-09	7.0E-10	1.1E-01	3.7E-01	NA	1.9E-09	1.7E-09	NC	3.5E-09
2,4,6-Trinitrotoluene	3.2E-01	1.1E-08	2.9E-09	4.4E-10	3.0E-02	3.8E-02	NA	3.2E-10	1.1E-10	NC	4.3E-10
Dioxins	1.5E-05	4.9E-13	1.3E-13	2.0E-14	1.5E+05	1.7E+05	1.5E+05	7.3E-08	2.3E-08	3.0E-09	9.9E-08
							Total Cancer Risk:	8E-08	2E-08	1E-07	2E-07

Chemical	Exposure Point Concentration (mg/kg)	Subchronic Oral Dose (mg/kg-day)	Subchronic Dermal Dose (mg/kg-day)	Subchronic Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Cadmium	1.3E+01	3.0E-05	2.7E-07	1.2E-06	1.0E-03	7.0E-05	NA	3.0E-02	3.8E-03	NC	3.3E-02
Lead	6.8E+01	1.6E-04	1.4E-06	6.7E-06	NA	NA	NA	NC	NC	NC	NC
Silver	8.0E+00	1.9E-05	1.7E-07	7.8E-07	5.0E-03	5.0E-04	NA	3.8E-03	3.4E-04	NC	4.1E-03
Zinc	4.5E+02	1.1E-03	9.4E-06	4.4E-05	3.0E-01	9.0E-02	NA	3.5E-03	1.0E-04	NC	3.6E-03
RDX	5.0E-01	1.2E-06	3.2E-07	4.9E-08	3.0E-03	9.0E-04	NA	3.9E-04	3.5E-04	NC	7.5E-04
2,4,6-Trinitrotoluene	3.2E-01	7.4E-07	2.0E-07	3.1E-08	5.0E-04	4.0E-04	NA	1.5E-03	5.0E-04	NC	2.0E-03
							Total Hazard Index:	4E-02	5E-03	0E+00	4E-02

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 1b - BURN PAD

RME RISK CALCULATIONS FOR FUTURE TEAD-N RESIDENT

Chemical	Exposure Point Concentration (mg/kg)	Soil Lifetime Average Oral Dose (mg/kg-day)	Soil Lifetime Average Dermal Dose (mg/kg-day)	Soil Lifetime Average Inhalation Dose (mg/kg-day)	Produce Lifetime Average Oral Dose (mg/kg-day)	Beef Lifetime Average Oral Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Soil Ingestion Cancer Risk	Soil Dermal Cancer Risk	Soil Inhalation Cancer Risk	Produce Ingestion Cancer Risk	Beef Ingestion Cancer Risk	Total Cancer Risk
2,4,6-Trinitrotoluene	6.4E-01	1.0E-06	4.1E-07	3.2E-09	6.8E-03	1.4E-12	3.0E-02	3.8E-02	NA	3.0E-08	1.5E-08	NC	2.0E-04	4.3E-14	2.0E-04
Dioxins/Furans	1.5E-05	2.3E-11	9.3E-12	7.2E-14	1.6E-10	1.2E-13	1.5E+05	1.7E+05	1.5E+05	3.4E-06	1.6E-06	1.1E-08	2.5E-05	1.8E-08	3.0E-05
									Total Cancer Risk:	3E-06	2E-06	1E-08	2E-04	2E-08	2E-04

Chemical	Exposure Point Concentration (mg/kg)	Soil Chronic Oral Dose (mg/kg-day)	Soil Chronic Dermal Dose (mg/kg-day)	Soil Chronic Inhalation Dose (mg/kg-day)	Produce Chronic Oral Dose (mg/kg-day)	Beef Chronic Oral Dose (mg/kg-day)	Oral RfD	Dermal RfD	Inhalation RfD	Soil Ingestion Hazard Quotient	Soil Dermal Hazard Quotient	Soil Inhalation Hazard Quotient	Produce Ingestion Hazard Quotient	Beef Ingestion Hazard Quotient	Total Hazard Quotient
Lead	1.7E+01	2.2E-04	1.5E-06	5.0E-07	3.4E-04	4.7E-10	NA	NA	NA	NC	NC	NC	NC	NC	NC
Zinc	6.2E+01	7.9E-04	5.3E-06	1.8E-06	NC	2.3E-06	3.0E-01	9.0E-02	NA	2.6E-03	5.9E-05	NC	NC	7.6E-06	2.7E-03
2,4,6-Trinitrotoluene	6.4E-01	8.2E-06	1.6E-06	1.9E-08	3.6E-02	8.9E-12	5.0E-04	4.0E-04	NA	1.6E-02	4.1E-03	NC	7.2E+01	1.8E-08	7.2E+01
									Total Hazard Index:	2E-02	4E-03	NC	7E+01	8E-06	7E+01

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 1b DEPOT WORKER

INPUT		OUTPUT					
MEDIUM	LEVEL		percentiles				
			50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.1	BLOOD Pb, ADULT (µg/dL)	1.9	3.0	3.4	3.9	4.3
LEAD IN SOIL (ug/g)	17						
LEAD IN WATER (ug/l)	15						
PLANT UPTAKE? 1=YES 0=NO	0						
AIRBORNE DUST (ug/m^3)	50						

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	0.00	=	1E-04 (ug/dl)/(ug/day)	*	17 ug/g	*	1.85 g soil/day (5 g/m^2 * 0.37 m^2)		0%
SOIL INGESTION:	0.01	=	0.018 (ug/dl)/(ug/day)	*	17 ug/g	*	0.03 g soil/day		0%
INHALATION:	0.17	=	1.64 (ug/dl)/(ug/m^3)	*	0.10 ug/m^3				9%
WATER INGESTION:	0.84	=	0.04 (ug/dl)/(ug/day)	*	15 ug/l	*	1.4 l water/day		44%
FOOD INGESTION:	0.88	=	0.04 (ug/dl)/(ug/day)	*	10.0 ug Pb/kg diet	*	2.2 kg diet/day		46%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD = .945 * 10 + 0.055 * Pb in produce (ug/kg) = 10.0 ug/kg

LEAD IN PRODUCE = 10 ug/kg or 0.00045 * soil lead d = 10.0 ug/kg

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 1b CONSTRUCTION WORKER

INPUT		OUTPUT					
MEDIUM	LEVEL			percentiles			
			50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.1						
LEAD IN SOIL (ug/g)	68.2	BLOOD Pb, ADULT (µg/dL)	2.0	3.1	3.5	4.0	4.4
LEAD IN WATER (ug/l)	15						
PLANT UPTAKE? 1=YES 0=NO	0						
AIRBORNE DUST (ug/m^3)	50						

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	0.01	=	1E-04	(ug/dl)/(ug/day) *	68	ug/g *	1.85	g soil/day (5 g/m^2 * 0.37 m^2)	1%
SOIL INGESTION:	0.06	=	0.018	(ug/dl)/(ug/day) *	68	ug/g *	0.05	g soil/day	3%
INHALATION:	0.17	=	1.64	(ug/dl)/(ug/m^3) *	0.10	ug/m^3			9%
WATER INGESTION:	0.84	=	0.04	(ug/dl)/(ug/day) *	15	ug/l *	1.4	l water/day	43%
FOOD INGESTION:	0.88	=	0.04	(ug/dl)/(ug/day) *	10.0	ug Pb/kg diet *	2.2	kg diet/day	45%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD = .945 * 10 + 0.055 * Pb in produce (ug/kg) = 10.0 ug/kg

LEAD IN PRODUCE = 10 ug/kg or 0.00045 * soil lead d = 10.0 ug/kg

TOXICITY INDICIES SCREEN FOR SELECTION OF COPCs
SWMU 1b - BURN PAD

Compound	Maximum Concentration mg/kg	Percent of Detects	Chronic Oral RfD	Non-carcinogenic Index	Percent of Total	Oral Slope Factor	Carcinogenic Index	Percent of Total	Comments
Cadmium	3.67E+01	23	1.00E-03	**3.67E+04**	71.3				71
Silver	3.50E+01	15	5.00E-03	**7.00E+03**	13.6				84.869
Zinc	1.74E+03	100	3.00E-01	**5.80E+03**	11.3				96.133
2,4,6-Trinitrotoluene	6.40E-01	8	5.00E-04	**1.28E+03**	2.5	3.00E-02	1.92E-02	0.8	98.619
Mercury	1.14E-01	8	3.00E-04	3.80E+02	0.7				
Cyclonite (RDX)	9.94E-01	15	3.00E-03	3.31E+02	0.6	1.10E-01	**1.09E-01**	4.8	100.000
Copper	7.37E+02	100							100.000
Lead	2.27E+02	100							100.000
Dioxins/Furans(a)	1.45E-05	100				1.50E+05	**2.17E+00**	94.4	
			Total noncarcinogenic index:	5.15E+04			Total carcinogenic index:	2.30E+00	
			Total noncarcinogenic index for COPCs:	5.08E+04			Total carcinogenic index for COPCs:	2.28E+00	

Contaminants of potential concern (COPCs) are in bold and underlined.

(a) Concentration based on toxicity equivalence factor

TEAD-N, SWMU 1b - BURN PAD

RME RISK CALCULATIONS FOR SECURITY WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
2,4,6-Trinitrotoluene	6.40E-01	4.5E-09	5.8E-08	5.6E-11	3.0E-02	3.8E-02	NA	1.3E-10	2.2E-09	NC	2.3E-09
Dioxins/Furans	1.45E-05	1.0E-13	1.3E-12	1.3E-15	1.5E+05	1.7E+05	1.5E+05	1.5E-08	2.3E-07	1.9E-10	2.4E-07
							Total Cancer Risk:	2E-08	2E-07	2E-10	2E-07

Chemical	Exposure Point Concentration (mg/kg)	Oral Dose (mg/kg-day)	Dermal Dose (mg/kg-day)	Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Lead	1.70E+01	3.3E-07	1.4E-07	4.2E-09	NA	NA	NA	NC	NC	NC	NC
Zinc	6.18E+01	1.2E-06	5.2E-07	1.5E-08	3.0E-01	9.0E-02	NA	4.0E-06	5.8E-06	NC	9.8E-06
2,4,6-Trinitrotoluene	6.40E-01	1.3E-08	1.6E-07	1.6E-10	5.0E-04	4.0E-04	NA	2.5E-05	4.0E-04	NC	4.3E-04
							Total Hazard Index:	3E-05	4E-04	NC	4E-04

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

OUTPUT FROM EPA IEUBK LEAD 0.5 MODEL FOR CHILDREN (SWMU 1b)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	17.0	200.0
1-2	17.0	200.0
2-3	17.0	200.0
3-4	17.0	200.0
4-5	17.0	200.0
5-6	17.0	200.0
6-7	17.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

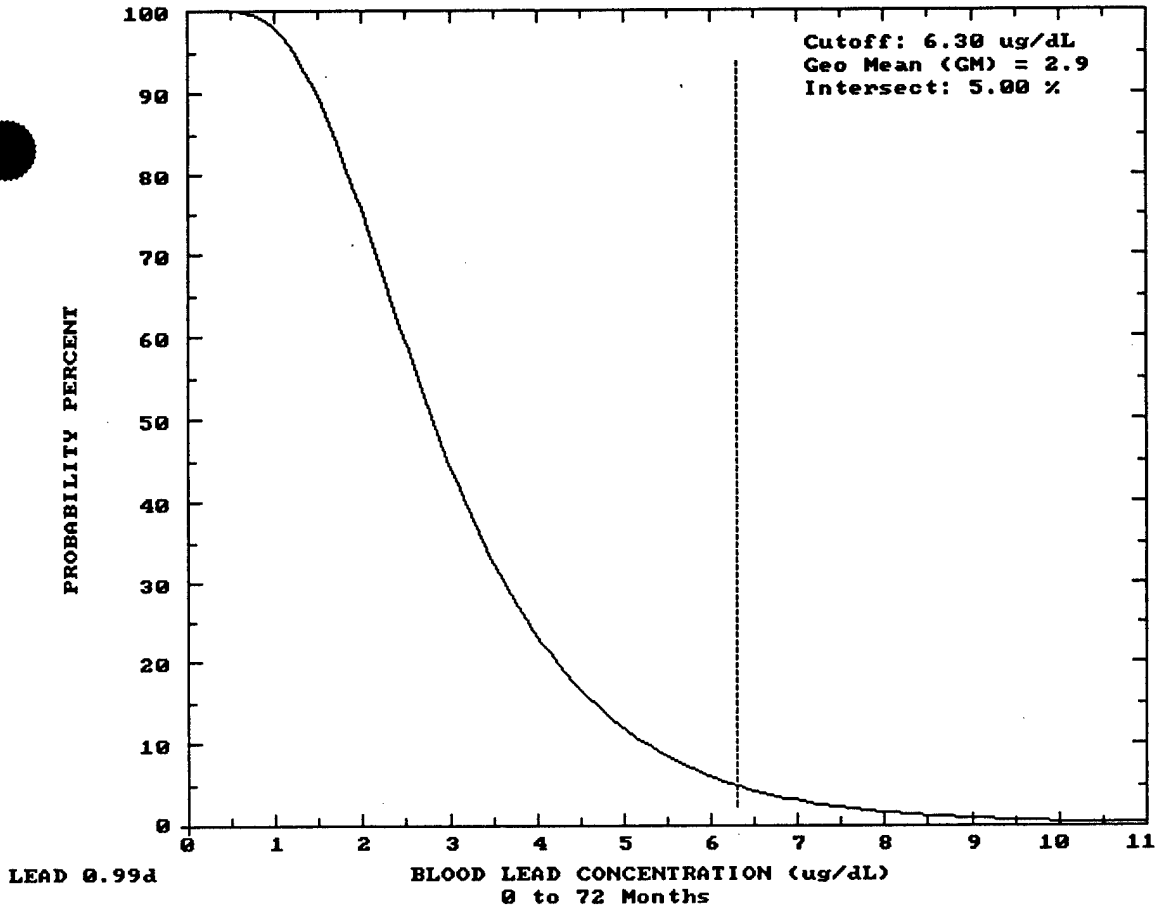
MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	3.2	5.79	2.81
1-2:	3.4	8.10	4.44
2-3:	3.2	8.56	4.47
3-4:	3.0	8.54	4.51
4-5:	2.6	7.40	3.39
5-6:	2.3	7.34	3.07
6-7:	2.1	7.52	2.90

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.59	0.37	0.00	0.02
1-2:	2.69	0.93	0.00	0.03
2-3:	3.05	0.98	0.00	0.06

3-4:	2.96	1.00	0.00	0.07
4-5:	2.89	1.06	0.00	0.07
5-6:	3.06	1.12	0.00	0.09
6-7:	3.39	1.14	0.00	0.09


Cutoff: 6.30 ug/dL
Geo Mean (GM) = 2.9
Intersect: 5.00 %
PROBABILITY PERCENT
100
90
80
70
60
50
40
30
20
10
0
0
1
2
3
4
5
6
7
8
9
10
11
LEAD 0.99d
BLOOD LEAD CONCENTRATION (ug/dL)
0 to 72 Months

SWMU 1c

TOXICITY INDICIES FOR SELECTION OF COPCs
SWMU 1c - TRASH BURN PITS

Compound	Maximum Concentration mg/kg	Percent of Detects	Chronic Oral RfD	Non-carcinogenic Index	Percent of Total	Oral Slope Factor	Carcinogenic Index	Percent of Total		Comments
Thallium	6.50E+01	9	8.00E-05	**8.13E+05**	54.0					
Barium	1.30E+04	100	7.00E-02	**1.86E+05**	12.4				66.399	
HMX	5.40E+03	9	5.00E-02	**1.08E+05**	7.2				73.583	
Zinc	2.20E+04	100	3.00E-01	**7.33E+04**	4.9				78.461	
Cadmium	7.29E+01	37	1.00E-03	**7.29E+04**	4.8				83.311	
Antimony	2.60E+01	14	4.00E-04	**6.50E+04**	4.3				87.634	
Arsenic	1.70E+01	100	3.00E-04	**5.67E+04**	3.8	1.80E+00	**3.06E+01**	41.8	91.404	
Chromium	2.50E+02	91	5.00E-03	**5.00E+04**	3.3				94.729	
Manganese	2.40E+03	100	1.40E-01	**1.71E+04**	1.1				95.870	
Cyclonite (RDX)	4.70E+01	9	3.00E-03	**1.57E+04**	1.0	1.10E-01	**5.17E+00**	7.1	96.912	
Silver	7.00E+01	35	5.00E-03	**1.40E+04**	0.9				97.843	
Nickel	2.70E+02	100	2.00E-02	**1.35E+04**	0.9				98.741	
2,4,6-Trinitrotoluene	5.05E+00	7	5.00E-04	**1.01E+04**	0.7	3.00E-02	1.52E-01	0.21	99.413	
Vanadium	4.77E+01	98	7.00E-03	6.81E+03	0.5				99.866	
Beryllium	8.50E+00	40	5.00E-03	1.70E+03	0.1	4.30E+00	**3.66E+01**	50.0	99.979	
Selenium	7.82E-01	19	5.00E-03	1.56E+02	0.01				99.990	
Hexachlorobenzene	8.60E-02	38	8.00E-04	1.08E+02	0.01	1.60E+00	1.38E-01	0.2	99.997	
Bis(2-ethylhexyl)phthalate	7.10E-01	17	2.00E-02	3.55E+01	0.002	1.40E-02	9.94E-03	0.01	99.999	
1,2,4-Trichlorobenzene	6.90E-02	17	1.00E-02	6.90E+00	0.0005				100.000	
Napthalene	7.80E-02	33	4.00E-02	1.95E+00	0.0001				100.000	
Pyrene	4.90E-02	17	3.00E-02	1.63E+00	0.0001				100.000	
Methylene chloride	2.00E-02	3	6.00E-02	3.33E-01	0.00002	7.50E-03	1.50E-04	0.0002	100.000	
Acetone	3.30E-02	5	1.00E-01	3.30E-01	0.00002				100.000	
Tetrachloroethene	2.00E-03	5	7.00E-03	2.86E-01	0.00002	5.10E-02	1.02E-04	0.0001	100.000	
Chloroform	1.00E-03	5	1.00E-02	1.00E-01	0.00001	6.10E-03	6.10E-06	0.00001	100.000	
Toluene	1.00E-03	5	2.00E-01	5.00E-03	0.0000003				100.000	
Dioxins	3.44E-06	100				1.50E+05	**5.16E-01**	0.71		
Cobalt	3.00E+01	95								
Copper	6.92E+02	100								
Lead	4.40E+03	100								
			Total noncarcinogenic index:	1.50E+06			Total carcinogenic index:	7.31E+01		
			Total noncarcinogenic index for COPCs:	1.49E+06			Total carcinogenic index for COPCs:	7.28E+01		

Contaminants of potential concern (COPCs) are in bold and underlined.

TEAD-N, SWMU 1c - TRASH BURN PITS

RME RISK CALCULATIONS FOR SECURITY WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Arsenic	5.1E+00	3.6E-08	1.5E-08	4.5E-10	1.8E+00	1.8E+00	1.5E+01	6.5E-08	2.8E-08	6.7E-09	9.9E-08
Beryllium	8.6E-01	6.0E-09	2.6E-09	7.5E-11	4.3E+00	8.6E+01	8.4E+00	2.6E-08	2.2E-07	6.3E-10	2.5E-07
Cadmium	2.3E+01	1.6E-07	6.9E-08	2.0E-09	NA	NA	6.3E+00	NC	NC	1.3E-08	1.3E-08
Chromium(VI)	7.6E-01	5.3E-09	2.3E-09	6.6E-11	NA	NA	4.1E+01	NC	NC	2.7E-09	2.7E-09
Cyclonite (RDX)	2.8E+01	1.9E-07	2.5E-06	2.4E-09	1.1E-01	3.7E-01	NA	2.1E-08	9.1E-07	NC	9.3E-07
Dioxins/Furans	4.4E-06	3.1E-14	4.0E-13	3.9E-16	1.5E+05	1.7E+05	1.5E+05	4.7E-09	6.9E-08	5.8E-11	7.4E-08
							Total Cancer Risk:	1E-07	1E-06	2E-08	1E-06

Chemical	Exposure Point Concentration (mg/kg)	Oral Dose (mg/kg-day)	Dermal Dose (mg/kg-day)	Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Antimony	7.0E+00	1.4E-07	5.9E-08	1.7E-09	4.0E-04	4.0E-06	NA	3.4E-04	1.5E-02	NC	1.5E-02
Arsenic	5.1E+00	1.0E-07	4.3E-08	1.3E-09	3.0E-04	3.0E-04	NA	3.4E-04	1.4E-04	NC	4.8E-04
Barium	1.6E+02	3.1E-06	1.3E-06	3.9E-08	7.0E-02	3.5E-03	1.0E-03	4.5E-05	3.8E-04	3.9E-05	4.7E-04
Beryllium	8.6E-01	1.7E-08	7.2E-09	2.1E-10	5.0E-03	2.5E-04	NA	3.4E-06	2.9E-05	NC	3.2E-05
Cadmium	2.3E+01	4.5E-07	1.9E-07	5.6E-09	1.0E-03	7.0E-05	NA	4.5E-04	2.8E-03	NC	3.2E-03
Chromium (VI)	7.6E-01	1.5E-08	6.4E-09	1.9E-10	5.0E-03	5.5E-04	NA	3.0E-06	1.2E-05	NC	1.5E-05
Chromium (III)	1.4E+01	2.8E-07	1.2E-07	3.5E-09	1.0E+00	4.0E-02	NA	2.8E-07	3.0E-06	NC	3.3E-06
Lead	1.4E+02	2.6E-06	1.1E-06	3.3E-08	NA	NA	NA	NC	NC	NC	NC
Manganese	3.7E+02	7.3E-06	3.1E-06	9.1E-08	1.4E-01	4.2E-03	1.4E-05	5.2E-05	7.5E-04	6.4E-03	7.2E-03
Nickel	1.3E+01	2.6E-07	1.1E-07	3.2E-09	2.0E-02	2.0E-03	NA	1.3E-05	5.6E-05	NC	6.8E-05
Silver	3.1E+01	6.1E-07	2.6E-07	7.6E-09	5.0E-03	5.0E-04	NA	1.2E-04	5.2E-04	NC	6.5E-04
Zinc	1.5E+02	2.9E-06	1.2E-06	3.6E-08	3.0E-01	9.0E-02	NA	9.7E-06	1.4E-05	NC	2.3E-05
Cyclonite (RDX)	2.8E+01	5.4E-07	2.3E-07	6.8E-09	3.0E-03	9.0E-04	NA	1.8E-04	2.6E-04	NC	4.4E-04
HMX	4.2E+00	8.3E-08	3.6E-08	1.0E-09	5.0E-02	7.5E-03	NA	1.7E-06	4.7E-06	NC	6.4E-06
							Total Hazard Index:	2E-03	2E-02	6E-03	3E-02

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure

N Tooele Army Depot North Area

SWMU 1c - TRASH BURN PITS
TEST PITS EP-01-108 AND EP-01-109 HOT SPOT ANALYSIS

RME RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Dermal Slope Factor mg/kg-day)-	Inhalation Slope Factor (mg/kg-day)-1	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Chemical Cancer Risk
Arsenic	1.7E+01	5.7E-08	5.1E-10	2.4E-09	1.8E+00	1.8E+00	1.5E+01	1.0E-07	9.2E-10	3.6E-08	1.4E-07
Beryllium	7.7E-01	2.6E-09	2.3E-11	1.1E-10	4.3E+00	8.6E+01	8.4E+00	1.1E-08	2.0E-09	9.0E-10	1.4E-08
Cadmium	7.3E+01	2.4E-07	2.2E-09	1.0E-08	NA	NA	6.3E+00	NC	NC	6.4E-08	6.4E-08
Chromium (VI)	2.4E+00	8.1E-09	7.2E-11	3.4E-10	NA	NA	4.1E+01	NC	NC	1.4E-08	1.4E-08
							Total Cancer Risk:	1E-07	3E-09	1E-07	2E-07

Chemical	Exposure Point Concentration (mg/kg)	Subchronic Oral Dose (mg/kg-day)	Subchronic Dermal Dose (mg/kg-day)	Subchronic Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Antimony	1.0E+01	2.4E-06	2.2E-08	1.0E-07	4.0E-04	4.0E-06	NA	6.1E-03	5.5E-03	NC	1.2E-02
Arsenic	1.7E+01	4.0E-06	3.6E-08	1.7E-07	3.0E-04	3.0E-04	NA	1.3E-02	1.2E-04	NC	1.3E-02
Barium	1.3E+04	3.1E-03	2.7E-05	1.3E-04	7.0E-02	3.5E-03	1.0E-03	4.4E-02	7.8E-03	1.3E-01	1.8E-01
Beryllium	7.7E-01	1.8E-07	1.6E-09	7.5E-09	5.0E-03	2.5E-04	NA	3.6E-05	6.4E-06	NC	4.2E-05
Cadmium	7.3E+01	1.7E-05	1.5E-07	7.1E-07	1.0E-03	7.0E-05	NA	1.7E-02	2.2E-03	NC	1.9E-02
Chromium (VI)	2.4E+00	5.6E-07	5.0E-09	2.3E-08	2.0E-02	2.2E-03	NA	2.8E-05	2.3E-06	NC	3.0E-05
Chromium (III)	4.6E+01	1.1E-05	9.6E-08	4.5E-07	1.0E+01	4.0E-01	NA	1.1E-06	2.4E-07	NC	1.3E-06
Lead	6.9E+02	1.6E-04	1.5E-06	6.8E-06	NA	NA	NA	NC	NC	NC	NC
Manganese	4.5E+02	1.1E-04	9.5E-07	4.4E-06	1.4E-01	4.2E-03	1.4E-05	7.6E-04	2.3E-04	3.1E-01	3.1E-01
Nickel	2.6E+01	6.0E-06	5.4E-08	2.5E-07	2.0E-02	2.0E-03	NA	3.0E-04	2.7E-05	NC	3.3E-04
Silver	2.8E+01	6.6E-06	5.9E-08	2.7E-07	5.0E-03	5.0E-04	NA	1.3E-03	1.2E-04	NC	1.4E-03
Thallium	8.2E+00	1.9E-06	1.7E-08	8.0E-08	8.0E-04	8.0E-04	NA	2.4E-03	2.2E-05	NC	2.4E-03
Zinc	1.8E+03	4.2E-04	3.8E-06	1.8E-05	3.0E-01	9.0E-02	NA	1.4E-03	4.2E-05	NC	1.4E-03
							Total Hazard Index:	9E-02	2E-02	4E-01	5E-01

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

SWMU 1c - TRASH BURN PITS
TEST PITS EP-01-114 AND EP-01-115 HOT SPOT ANALYSIS

RME RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Dermal Slope Factor mg/kg-day)-	Inhalation Slope Factor (mg/kg-day)-1	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Chemical Cancer Risk
Arsenic	1.2E+01	4.0E-08	3.6E-10	1.7E-09	1.8E+00	1.8E+00	1.5E+01	7.2E-08	6.5E-10	2.5E-08	9.8E-08
Beryllium	8.5E+00	2.9E-08	2.6E-10	1.2E-09	4.3E+00	8.6E+01	8.4E+00	1.2E-07	2.2E-08	1.0E-08	1.5E-07
Cadmium	3.0E+01	9.9E-08	8.9E-10	4.1E-09	NA	NA	6.3E+00	NC	NC	2.6E-08	2.6E-08
Chromium (VI)	1.3E+01	4.2E-08	3.8E-10	1.7E-09	NA	NA	4.1E+01	NC	NC	7.2E-08	7.2E-08
RDX	4.5E+01	1.5E-07	4.1E-08	6.3E-09	1.1E-01	3.7E-01	NA	1.7E-08	1.5E-08	NC	3.1E-08
2,4,6-Trinitrotoluene	3.3E+00	1.1E-08	2.9E-09	4.6E-10	3.0E-02	3.8E-02	NA	3.3E-10	1.1E-10	NC	4.4E-10
Dioxins	4.4E-06	1.5E-14	4.0E-15	6.2E-16	1.5E+05	1.7E+05	1.5E+05	2.2E-09	6.9E-10	9.3E-11	3.0E-09
							Total Cancer Risk:	2E-07	4E-08	1E-07	4E-07

Chemical	Exposure Point Concentration (mg/kg)	Subchronic Oral Dose (mg/kg-day)	Subchronic Dermal Dose (mg/kg-day)	Subchronic Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Antimony	2.6E+01	6.1E-06	5.5E-08	2.5E-07	4.0E-04	4.0E-06	NA	1.5E-02	1.4E-02	NC	2.9E-02
Arsenic	1.2E+01	2.8E-06	2.5E-08	1.2E-07	3.0E-04	3.0E-04	NA	9.4E-03	8.4E-05	NC	9.5E-03
Barium	5.3E+02	1.2E-04	1.1E-06	5.2E-06	7.0E-02	3.5E-03	1.0E-03	1.8E-03	3.2E-04	5.2E-03	7.3E-03
Beryllium	8.5E+00	2.0E-06	1.8E-08	8.3E-08	5.0E-03	2.5E-04	NA	4.0E-04	7.2E-05	NC	4.7E-04
Cadmium	3.0E+01	6.9E-06	6.2E-08	2.9E-07	1.0E-03	7.0E-05	NA	6.9E-03	8.9E-04	NC	7.8E-03
Chromium (VI)	1.3E+01	2.9E-06	2.6E-08	1.2E-07	2.0E-02	2.2E-03	NA	1.5E-04	1.2E-05	NC	1.6E-04
Chromium (III)	2.4E+02	5.6E-05	5.0E-07	2.3E-06	1.0E+01	4.0E-01	NA	5.6E-06	1.2E-06	NC	6.8E-06
Lead	4.4E+03	1.0E-03	9.3E-06	4.3E-05	NA	NA	NA	NC	NC	NC	NC
Manganese	2.4E+03	5.6E-04	5.0E-06	2.3E-05	1.4E-01	4.2E-03	1.4E-05	4.0E-03	1.2E-03	1.6E+00	1.6E+00
Nickel	2.7E+02	6.3E-05	5.7E-07	2.6E-06	2.0E-02	2.0E-03	NA	3.2E-03	2.8E-04	NC	3.5E-03
Silver	4.5E+00	1.1E-06	9.5E-09	4.4E-08	5.0E-03	5.0E-04	NA	2.1E-04	1.9E-05	NC	2.3E-04
Thallium	6.5E+01	1.5E-05	1.4E-07	6.4E-07	8.0E-04	8.0E-04	NA	1.9E-02	1.7E-04	NC	1.9E-02
Zinc	4.7E+03	1.1E-03	9.9E-06	4.6E-05	3.0E-01	9.0E-02	NA	3.7E-03	1.1E-04	NC	3.8E-03
HMX	5.4E+03	1.3E-03	3.4E-04	5.3E-05	5.0E-02	7.5E-03	NA	2.5E-02	4.5E-02	NC	7.1E-02
RDX	4.5E+01	1.1E-05	2.8E-06	4.4E-07	3.0E-03	9.0E-04	NA	3.5E-03	3.2E-03	NC	6.7E-03
2,4,6-Trinitrotoluene	3.3E+00	7.7E-07	2.1E-07	3.2E-08	5.0E-04	4.0E-04	NA	1.5E-03	5.2E-04	NC	2.1E-03
							Total Hazard Index:	9E-02	7E-02	2E+00	2E+00

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 1c - TRASH BURN PITS

RME RISK CALCULATIONS FOR FUTURE TEAD-N RESIDENT

Chemical	Exposure Point Concentration (mg/kg)	Soil Lifetime Average Oral Dose (mg/kg-day)	Soil Lifetime Average Dermal Dose (mg/kg-day)	Soil Lifetime Average Inhalation Dose (mg/kg-day)	Produce Lifetime Average Oral Dose (mg/kg-day)	Beef Lifetime Average Oral Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Soil Ingestion Cancer Risk	Soil Dermal Cancer Risk	Soil Inhalation Cancer Risk	Produce Ingestion Cancer Risk	Beef Ingestion Cancer Risk	Total Cancer Risk
Arsenic	5.1E+00	8.0E-06	1.1E-07	2.5E-08	1.7E-05	1.8E-09	1.8E+00	1.8E+00	1.5E+01	1.4E-05	2.0E-07	3.8E-07	3.0E-05	3.2E-09	4.5E-05
Beryllium	8.6E-01	1.3E-06	1.8E-08	4.2E-09	7.0E-07	2.1E-10	4.3E+00	8.6E+01	8.4E+00	5.8E-06	1.6E-06	3.6E-08	3.0E-06	9.2E-10	1.0E-05
Cadmium	2.3E+01	3.6E-05	4.9E-07	1.1E-07	1.1E-03	2.4E-09	NA	NA	6.3E+00	NC	NC	7.2E-07	NC	NC	7.2E-07
Cyclonite (RDX)	2.8E+01	4.3E-05	1.8E-05	1.4E-07	7.7E-01	1.2E-10	1.1E-01	3.7E-01	NA	4.8E-06	6.5E-06	NC	8.5E-02	1.3E-11	8.5E-02
Dioxins/Furans	4.4E-06	7.0E-12	2.8E-12	2.2E-14	5.0E-11	1.5E-13	1.5E+05	1.7E+05	1.5E+05	1.0E-06	4.9E-07	3.3E-09	7.6E-06	2.2E-08	9.1E-06
									Total Cancer Risk:	3E-05	9E-06	1E-06	9E-02	3E-08	9E-02

Chemical	Exposure Point Concentration (mg/kg)	Soil Chronic Oral Dose (mg/kg-day)	Soil Chronic Dermal Dose (mg/kg-day)	Soil Chronic Inhalation Dose (mg/kg-day)	Produce Chronic Oral Dose (mg/kg-day)	Beef Chronic Oral Dose (mg/kg-day)	Oral RfD	Dermal RfD	Inhalation RfD	Soil Ingestion Hazard Quotient	Soil Dermal Hazard Quotient	Soil Inhalation Hazard Quotient	Produce Ingestion Hazard Quotient	Beef Ingestion Hazard Quotient	Total Hazard Quotient
Antimony	7.0E+00	8.9E-05	6.0E-07	2.1E-07	6.0E-04	1.7E-08	4.0E-04	4.0E-06	NA	2.2E-01	1.5E-01	NC	1.5E+00	4.2E-05	1.9E+00
Arsenic	5.1E+00	6.6E-05	4.4E-07	1.5E-07	8.9E-05	1.1E-08	3.0E-04	3.0E-04	NA	2.2E-01	1.5E-03	NC	3.0E-01	3.8E-05	5.2E-01
Barium	1.6E+02	2.0E-03	1.4E-05	4.7E-06	9.9E-03	5.2E-08	7.0E-02	3.5E-03	1.0E-04	2.9E-02	3.9E-03	4.7E-02	1.4E-01	7.4E-07	2.2E-01
Beryllium	8.6E-01	1.1E-05	7.3E-08	2.5E-08	3.7E-06	1.3E-09	5.0E-03	2.5E-04	NA	2.2E-03	2.9E-04	NC	7.4E-04	2.7E-07	3.2E-03
Cadmium	2.3E+01	2.9E-04	2.0E-06	6.8E-07	6.0E-03	1.5E-08	1.0E-03	7.0E-05	NA	2.9E-01	2.8E-02	NC	6.0E+00	1.5E-05	6.3E+00
Chromium (VI)	7.6E-01	9.7E-06	6.5E-08	2.2E-08	3.4E-06	2.2E-09	5.0E-03	5.5E-04	NA	1.9E-03	1.2E-04	NC	6.7E-04	4.5E-07	2.7E-03
Chromium (III)	1.4E+01	1.8E-04	1.2E-06	4.3E-07	6.4E-05	4.3E-08	1.0E+00	4.0E-02	NA	1.8E-04	3.1E-05	NC	6.4E-05	4.3E-08	2.8E-04
Lead	1.4E+02	1.7E-03	1.2E-05	4.0E-06	2.7E-03	1.6E-08	NA	NA	NA	NC	NC	NC	NC	NC	NC
Manganese	3.7E+02	4.8E-03	3.2E-05	1.1E-05	4.2E-02	3.9E-07	1.4E-01	4.2E-03	1.4E-05	3.4E-02	7.6E-03	7.7E-01	3.0E-01	2.8E-06	1.1E+00
Nickel	1.3E+01	1.7E-04	1.1E-06	3.9E-07	2.6E-04	4.1E-08	2.0E-02	2.0E-03	NA	8.4E-03	5.6E-04	NC	1.3E-02	2.0E-06	2.2E-02
Silver	3.1E+01	4.0E-04	2.7E-06	9.2E-07	NC	NC	5.0E-03	5.0E-04	NA	8.0E-02	5.3E-03	NC	NC	NC	8.5E-02
Zinc	1.5E+02	1.9E-03	1.3E-05	4.4E-06	NC	2.2E-05	3.0E-01	9.0E-02	NA	6.3E-03	1.4E-04	NC	NC	7.5E-05	6.5E-03
Cyclonite (RDX)	2.8E+01	3.5E-04	7.1E-05	8.2E-07	4.1E+00	7.7E-10	3.0E-03	9.0E-04	NA	1.2E-01	7.9E-02	NC	1.4E+03	2.6E-07	1.4E+03
HMX	4.2E+00	5.4E-05	1.1E-05	1.2E-07	1.7E+00	5.7E-11	5.0E-02	7.5E-03	NA	1.1E-03	1.4E-03	NC	3.4E+01	1.1E-09	3.4E+01
									Total Hazard Index:	1E+00	3E-01	8E-01	1E+03	2E-04	1E+03

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 1c DEPOT WORKER

INPUT		OUTPUT					
MEDIUM	LEVEL		percentiles				
			50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.1	BLOOD Pb, ADULT (µg/dL)	2.0	3.1	3.5	4.1	4.5
LEAD IN SOIL (ug/g)	135						
LEAD IN WATER (ug/l)	15						
PLANT UPTAKE? 1=YES 0=NO	0						
AIRBORNE DUST (ug/m^3)	50						

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate			percent of total
SOIL CONTACT:	0.03	=	0.00011	(ug/dl)/(ug/day) *	135	ug/g *	1.85	g soil/day	(5 g/m^2 * 0.37 m^2)	1%
SOIL INGESTION:	0.06	=	0.018	(ug/dl)/(ug/day) *	135	ug/g *	0.03	g soil/day		3%
INHALATION:	0.18	=	1.64	(ug/dl)/(ug/m^3) *	0.11	ug/m^3				9%
WATER INGESTION:	0.84	=	0.04	(ug/dl)/(ug/day) *	15	ug/l *	1.4	l water/day		42%
FOOD INGESTION:	0.88	=	0.04	(ug/dl)/(ug/day) *	10.0	ug Pb/kg diet *	2.2	kg diet/day		44%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD = .945 * 10 + 0.055 * Pb in produce (ug/kg) = 10.0 ug/kg

LEAD IN PRODUCE = 10 ug/kg or 0.00045 * soil lead d = 10.0 ug/kg

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 1c CONSTRUCTION WORKER

INPUT		OUTPUT					
MEDIUM	LEVEL		percentiles				
			50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.1	BLOOD Pb, ADULT (µg/dL)	2.4	3.7	4.2	4.8	5.3
LEAD IN SOIL (ug/g)	407						
LEAD IN WATER (ug/l)	15						
PLANT UPTAKE? 1=YES 0=NO	0						
AIRBORNE DUST (ug/m^3)	50						

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	0.08	=	0.00011 (ug/dl)/(ug/day)	*	407 ug/g	*	1.85	g soil/day (5 g/m^2 * 0.37 m^2)	3%
SOIL INGESTION:	0.36	=	0.018 (ug/dl)/(ug/day)	*	407 ug/g	*	0.05	g soil/day	15%
INHALATION:	0.20	=	1.64 (ug/dl)/(ug/m^3)	*	0.12 ug/m^3				8%
WATER INGESTION:	0.84	=	0.04 (ug/dl)/(ug/day)	*	15 ug/l	*	1.4	l water/day	36%
FOOD INGESTION:	0.88	=	0.04 (ug/dl)/(ug/day)	*	10.0 ug Pb/kg diet	*	2.2	kg diet/day	37%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD	=	.945 * 10 + 0.055 * Pb in produce (ug/kg)	=	10.0	ug/kg
LEAD IN PRODUCE	=	10 ug/kg or 0.00045 * soil lead d	=	10.0	ug/kg

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 1c EP-01-108 AND EP-01-109 HOT SPOT CONSTRUCTION WORKER

INPUT		OUTPUT						
MEDIUM	LEVEL			percentiles				
			50th	90th	95th	98th	99th	
LEAD IN AIR (ug/m^3)	0.1							
LEAD IN SOIL (ug/g)	691	BLOOD Pb, ADULT (µg/dL)	2.7	4.2	4.8	5.5	6.1	
LEAD IN WATER (ug/l)	15							
PLANT UPTAKE? 1=YES 0=NO	0							
AIRBORNE DUST (ug/m^3)	50							

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	0.13	=	0.00011 (ug/dl)/(ug/day)	*	691 ug/g	*	1.85 g soil/day (5 g/m^2 * 0.37 m^2)		5%
SOIL INGESTION:	0.61	=	0.018 (ug/dl)/(ug/day)	*	691 ug/g	*	0.05 g soil/day		23%
INHALATION:	0.22	=	1.64 (ug/dl)/(ug/m^3)	*	0.13 ug/m^3				8%
WATER INGESTION:	0.84	=	0.04 (ug/dl)/(ug/day)	*	15 ug/l	*	1.4 l water/day		31%
FOOD INGESTION:	0.88	=	0.04 (ug/dl)/(ug/day)	*	10.0 ug Pb/kg diet	*	2.2 kg diet/day		33%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD	=	.945 * 10 + 0.055 * Pb in produce (ug/kg)	=	10.0	ug/kg	
LEAD IN PRODUCE	=	10 ug/kg or 0.00045 * soil lead	d =	10.0	ug/kg	

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 1c TEST PITS EP-01-114 AND EP-01-115 HOT SPOT CONSTRUCTION WORKER

INPUT		OUTPUT					
MEDIUM	LEVEL		percentiles				
			50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.1	BLOOD Pb, ADULT (µg/dL)	7.0	10.9	12.4	14.3	15.8
LEAD IN SOIL (ug/g)	4400						
LEAD IN WATER (ug/l)	15						
PLANT UPTAKE? 1=YES 0=NO	0						
AIRBORNE DUST (ug/m^3)	50						

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	0.86	=	0.00011 (ug/dl)/(ug/day)	*	4400 ug/g	*	1.85 g soil/day (5 g/m^2 * 0.37 m^2)		12%
SOIL INGESTION:	3.87	=	0.018 (ug/dl)/(ug/day)	*	4400 ug/g	*	0.05 g soil/day		56%
INHALATION:	0.52	=	1.64 (ug/dl)/(ug/m^3)	*	0.32 ug/m^3				8%
WATER INGESTION:	0.84	=	0.04 (ug/dl)/(ug/day)	*	15 ug/l	*	1.4 l water/day		12%
FOOD INGESTION:	0.88	=	0.04 (ug/dl)/(ug/day)	*	10.0 ug Pb/kg diet	*	2.2 kg diet/day		13%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD	=	.945 * 10 + 0.055 * Pb in produce (ug/kg)	=	10.0	ug/kg	
LEAD IN PRODUCE	=	10 ug/kg or 0.00045 * soil lead	d =	10.0	ug/kg	

OUTPUT FROM EPA IEUBK LEAD 0.5 MODEL FOR CHILDREN (SWMU 1c)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
door AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	70.3	200.0
1-2	70.3	200.0
2-3	70.3	200.0
3-4	70.3	200.0
4-5	70.3	200.0
5-6	70.3	200.0
6-7	70.3	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

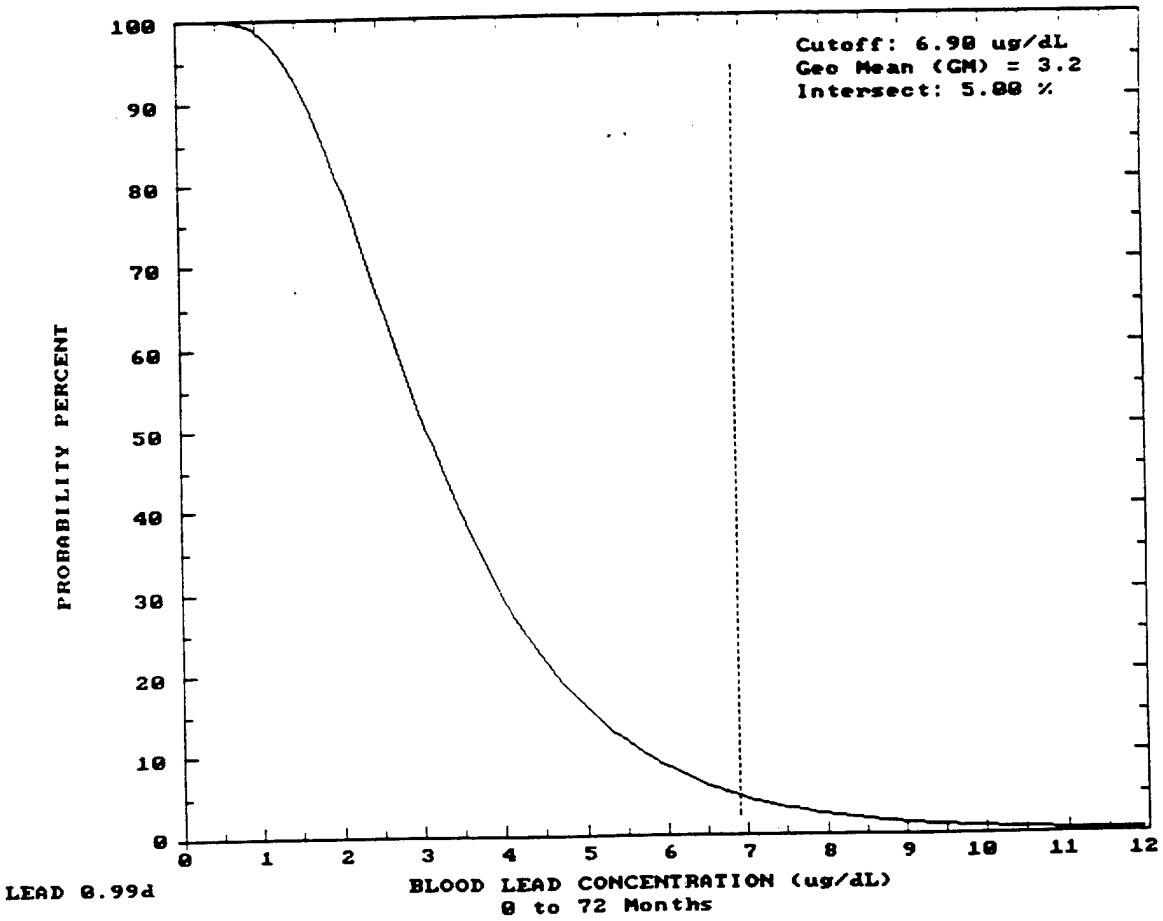
MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	3.4	6.33	3.36
1-2:	3.7	8.94	5.30
2-3:	3.5	8.41	5.35
3-4:	3.3	8.41	5.41
4-5:	2.8	8.05	4.07
5-6:	2.5	7.94	3.68
6-7:	2.3	8.09	3.49

YR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.57	0.37	0.00	0.02
1-2:	2.67	0.92	0.00	0.03
2-3:	3.03	0.97	0.00	0.06

3-4:	2.94	1.00	0.00	0.0[illegible]
4-5:	2.88	1.05	0.00	0.0[illegible]
5-6:	3.05	1.12	0.00	0.09
6-7:	3.38	1.1-	0.00	0.09


Cutoff: 6.90 ug/dL
Geo Mean (GM) = 3.2
Intersect: 5.00 %
PROBABILITY PERCENT
100
90
80
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12
BLOOD LEAD CONCENTRATION (ug/dL)
0 to 72 Months
LEAD 0.99d

SWMU 1d

TOXICITY INDICIES FOR SELECTION OF COPCs
SWMU 1d - PROPELLANT BURN PAD

Compound	Maximum Concentration mg/kg	Percent of Detects	Chronic Oral RfD	Non-carcinogenic Index	Percent of Total	Oral Slope Factor	Carcinogenic Index	Percent of Total	Comments
Thallium	1.62E+01	19	8.00E-05	**2.03E+05**	91.9				
2,4-Dinitrotoluene	1.73E+01	38	2.00E-03	**8.65E+03**	3.9	6.80E-01	**1.18E+01**	99.0	
Barium	3.51E+02	100	7.00E-02	**5.01E+03**	2.3				
Cadmium	1.71E+00	38	1.00E-03	**1.71E+03**	0.78				
Nickel	2.64E+01	100	2.00E-02	1.32E+03	0.60				
Mercury	1.21E-01	38	3.00E-04	**4.03E+02**	0.18				More toxic by inhalation
Cyclonite (RDX)	1.09E+00	13	3.00E-03	3.63E+02	0.16	1.10E-01	**1.20E-01**	1.0	
Selenium	1.38E+00	13	5.00E-03	2.76E+02	0.13				
Cyanide	1.41E+00	25	2.00E-02	7.05E+01	0.03				
Aluminum	1.62E+04	100							
Cobalt	8.93E+00	100							
Lead	2.03E+03	100							
			Total noncarcinogenic index:	2.20E+05			Total carcinogenic index:	1.19E+01	
			Total noncarcinogenic index for COPCs:	2.18E+05			Total carcinogenic index for COPCs:	1.19E+01	

Contaminants of potential concern (COPCs) are in bold and underlined.

TEAD-N, SWMU 1d - PROPELLANT BURN PANS

RME RISK CALCULATIONS FOR OB/OD WORKERS

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg/day)	Lifetime Average Dermal Dose (mg/kg/day)	Lifetime Average Inhalation Dose (mg/kg/day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Cadmium	1.6E+00	1.4E-07	1.2E-08	5.5E-08	NA	NC	6.3E+00	NC	NC	3.5E-07	3E-07
Cyclonite (RDX)	7.0E-01	6.1E-08	1.6E-07	2.4E-08	1.1E-01	3.7E-01	NA	6.7E-09	5.8E-08	NC	6E-08
							Total Cancer Risk:	6.7E-09	5.8E-08	3.5E-07	4E-07

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg/day)	Chronic Dermal Dose (mg/kg/day)	Chronic Inhalation Dose (mg/kg/day)	Oral RfD	Dermal RfD	Inhalation RfD	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Barium	3.2E+02	7.9E-05	6.8E-06	3.2E-05	7.0E-02	3.5E-03	1.0E-04	1.1E-03	1.9E-03	3.2E-01	3E-01
Cadmium	1.6E+00	3.9E-07	3.3E-08	1.5E-07	1.0E-03	7.0E-05	NA	3.9E-04	4.7E-04	NC	9E-04
Lead	1.3E+03	3.1E-04	2.7E-05	1.2E-04	NA	NA	NA	NC	NC	NC	NC
Mercury	9.1E-02	2.2E-08	1.9E-09	8.9E-09	3.0E-04	4.5E-05	8.6E-05	7.4E-05	4.3E-05	1.0E-04	2E-04
Thallium	9.8E+00	2.4E-06	2.1E-07	9.6E-07	8.0E-05	8.0E-05	NA	3.0E-02	2.6E-03	NC	3E-02
2,4-Dinitrotoluene	1.2E+01	2.8E-06	7.3E-06	1.1E-06	2.0E-03	1.5E-03	NA	1.4E-03	4.9E-03	NC	6E-03
Cyclonite (RDX)	7.0E-01	1.7E-07	4.4E-07	6.8E-08	3.0E-03	9.0E-04	NA	5.7E-05	4.9E-04	NC	5E-04
							Total Hazard Quotient:	3.3E-02	1.0E-02	3.2E-01	4E-01

NA Not analyzed
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 1d - PROPELLANT BURN PANS

RME RISK CALCULATIONS FOR FUTURE CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg/day)	Lifetime Average Dermal Dose (mg/kg/day)	Lifetime Average Inhalation Dose (mg/kg/day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Cadmium	9.8E-01	3.3E-08	3.0E-10	1.4E-09	NA	NA	6.3E+00	NC	NC	8.7E-09	9E-09
Cyclonite (RDX)	4.7E-01	1.6E-08	4.2E-09	6.5E-10	1.1E-01	3.7E-01	NA	1.7E-09	1.5E-09	NC	3E-09
							Total Cancer Risk:	1.7E-09	1.5E-09	8.7E-09	1E-08

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg/day)	Chronic Dermal Dose (mg/kg/day)	Chronic Inhalation Dose (mg/kg/day)	Oral RfD	Dermal RfD	Inhalation RfD	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Barium	2.4E+02	5.6E-04	5.0E-06	2.3E-05	7.0E-02	3.5E-03	1.0E-03	8.0E-03	1.4E-03	2.3E-02	3E-02
Cadmium	9.8E-01	2.3E-06	2.1E-08	9.6E-08	1.0E-03	7.0E-05	NA	2.3E-03	3.0E-04	NC	3E-03
Lead	5.8E+02	1.4E-03	1.2E-05	5.7E-05	NA	NA	NA	NA	NA	NA	NA
Mercury	6.3E-02	1.5E-07	1.3E-09	6.2E-09	3.0E-04	4.5E-05	8.6E-05	4.9E-04	2.9E-05	7.2E-05	6E-04
Thallium	7.3E+00	1.7E-05	1.5E-07	7.1E-07	8.0E-04	8.0E-04	NA	2.1E-02	1.9E-04	NC	2E-02
2,4-Dinitrotoluene	5.5E+00	1.3E-05	3.5E-06	5.4E-07	2.0E-03	1.5E-03	NA	6.5E-03	2.3E-03	NC	9E-03
Cyclonite (RDX)	4.7E-01	1.1E-06	2.9E-07	4.6E-08	3.0E-03	9.0E-04	NA	3.6E-04	3.3E-04	NC	7E-04
							Total Hazard Quotient:	3.9E-02	4.6E-03	2.3E-02	7E-02

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 1d - PROPELLANT BURN PANS

RME RISK CALCULATIONS FOR FUTURE TEAD-N RESIDENT

Chemical	Exposure Point Concentration (mg/kg)	Soil			Produce	Beef				Soil			Produce	Beef	
		Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Oral Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Ingestion Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Ingestion Cancer Risk	Ingestion Cancer Risk	Total Cancer Risk
Cadmium	1.6E+00	2.5E-06	3.4E-08	7.8E-09	7.8E-05	2.0E-11	NA	NA	6.3E+00	NC	NC	4.9E-08	NC	NC	4.9E-08
Cyclonite (RDX)	7.0E-01	1.1E-06	4.5E-07	3.5E-09	2.0E-02	3.8E-13	1.1E-01	3.7E-01	NA	1.2E-07	1.6E-07	NC	2.2E-03	4.2E-14	2.2E-03
									Total Cancer Risk:	1E-05	4E-07	5E-08	5E-02	1E-11	5E-02

Chemical	Exposure Point Concentration (mg/kg)	Soil			Produce	Beef				Soil			Produce	Beef	
		Chronic Oral Dose (mg/kg-day)	Chronic Dermal Dose (mg/kg-day)	Chronic Inhalation Dose (mg/kg-day)	Chronic Oral Dose (mg/kg-day)	Chronic Oral Dose (mg/kg-day)	Oral RfD	Dermal RfD	Inhalation RfD	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Ingestion Hazard Quotient	Ingestion Hazard Quotient	Total Hazard Quotient
Barium	3.2E+02	4.1E-03	2.8E-05	9.5E-06	2.0E-02	1.3E-08	7.0E-02	3.5E-03	1.0E-04	5.9E-02	7.9E-03	9.5E-02	2.9E-01	1.8E-07	4.5E-01
Cadmium	1.6E+00	2.0E-05	1.4E-07	4.7E-08	4.1E-04	1.3E-10	1.0E-03	7.0E-05	NA	2.0E-02	1.9E-03	NC	4.1E-01	1.3E-07	4.4E-01
Lead	1.3E+03	1.6E-02	1.1E-04	3.8E-05	2.6E-02	1.8E-08	NA	NA	NA	NC	NC	NC	NC	NC	NC
Mercury	9.1E-02	1.2E-06	7.8E-09	2.7E-09	3.7E-06	7.4E-12	3.0E-04	4.5E-05	8.6E-05	3.9E-03	1.7E-04	3.1E-05	1.2E-02	2.5E-08	1.7E-02
Thallium	9.8E+00	1.3E-04	8.4E-07	2.9E-07	1.6E-05	7.4E-08	8.0E-05	8.0E-05	NA	1.6E+00	1.0E-02	NC	2.0E-01	9.2E-04	1.8E+00
2,4-Dinitritoluene	1.2E+01	1.5E-04	9.9E-07	3.4E-07	3.9E-01	1.2E-10	2.0E-03	1.5E-03	NA	7.4E-02	6.6E-04	NC	2.0E+02	6.0E-08	2.0E+02
Cyclonite (RDX)	7.0E-01	8.9E-06	1.8E-06	2.1E-08	1.0E-01	2.4E-12	3.0E-03	9.0E-04	NA	3.0E-03	2.0E-03	NC	3.5E+01	7.9E-10	3.5E+01
									Total Hazard Index:	2E+00	2E-02	1E-01	2E+02	9E-04	2E+02

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 1d DEPOT WORKER

INPUT		OUTPUT						
MEDIUM	LEVEL				percentiles			
				50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.1	BLOOD Pb, ADULT (µg/dL)		2.8	4.4	5.0	5.7	6.3
LEAD IN SOIL (ug/g)	1268							
LEAD IN WATER (ug/l)	15							
PLANT UPTAKE? 1=YES 0=NO	0							
AIRBORNE DUST (ug/m^3)	50							

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	0.25	=	1E-04	(ug/dl)/(ug/day) *	1268	ug/g *	1.85	g soil/day (5 g/m^2 * 0.37 m^2)	9%
SOIL INGESTION:	0.56	=	0.018	(ug/dl)/(ug/day) *	1268	ug/g *	0.03	g soil/day	20%
INHALATION:	0.27	=	1.64	(ug/dl)/(ug/m^3) *	0.16	ug/m^3			10%
WATER INGESTION:	0.84	=	0.04	(ug/dl)/(ug/day) *	15	ug/l *	1.4	l water/day	30%
FOOD INGESTION:	0.88	=	0.04	(ug/dl)/(ug/day) *	10.0	ug Pb/kg diet *	2.2	kg diet/day	32%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD = .945 * 10 + 0.055 * Pb in produce (ug/kg) = 10.0 ug/kg

LEAD IN PRODUCE = 10 ug/kg or 0.00045 * soil lead d = 10.0 ug/kg

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 1d CONSTRUCTION WORKER

INPUT		OUTPUT					
MEDIUM	LEVEL		percentiles				
			50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.1						
LEAD IN SOIL (ug/g)	580.1	BLOOD Pb, ADULT (µg/dL)	2.6	4.0	4.5	5.3	5.8
LEAD IN WATER (ug/l)	15						
PLANT UPTAKE? 1=YES 0=NO	0						
AIRBORNE DUST (ug/m^3)	50						

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	0.11	=	1E-04 (ug/dl)/(ug/day)	*	580 ug/g	*	1.85 g soil/day (5 g/m^2 * 0.37 m^2)		4%
SOIL INGESTION:	0.51	=	0.018 (ug/dl)/(ug/day)	*	580 ug/g	*	0.05 g soil/day		20%
INHALATION:	0.21	=	1.64 (ug/dl)/(ug/m^3)	*	0.13 ug/m^3				8%
WATER INGESTION:	0.84	=	0.04 (ug/dl)/(ug/day)	*	15 ug/l	*	1.4 l water/day		33%
FOOD INGESTION:	0.88	=	0.04 (ug/dl)/(ug/day)	*	10.0 ug Pb/kg diet	*	2.2 kg diet/day		34%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD = .945 * 10 + 0.055 * Pb in produce (ug/kg) = 10.0 ug/kg

LEAD IN PRODUCE = 10 ug/kg or 0.00045 * soil lead d = 10.0 ug/kg

OUTPUT FROM EPA IEUBK LEAD 0.5 MODEL FOR CHILDREN (SWMU 1d)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
ndoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	705.9	200.0
1-2	705.9	200.0
2-3	705.9	200.0
3-4	705.9	200.0
4-5	705.9	200.0
5-6	705.9	200.0
6-7	705.9	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

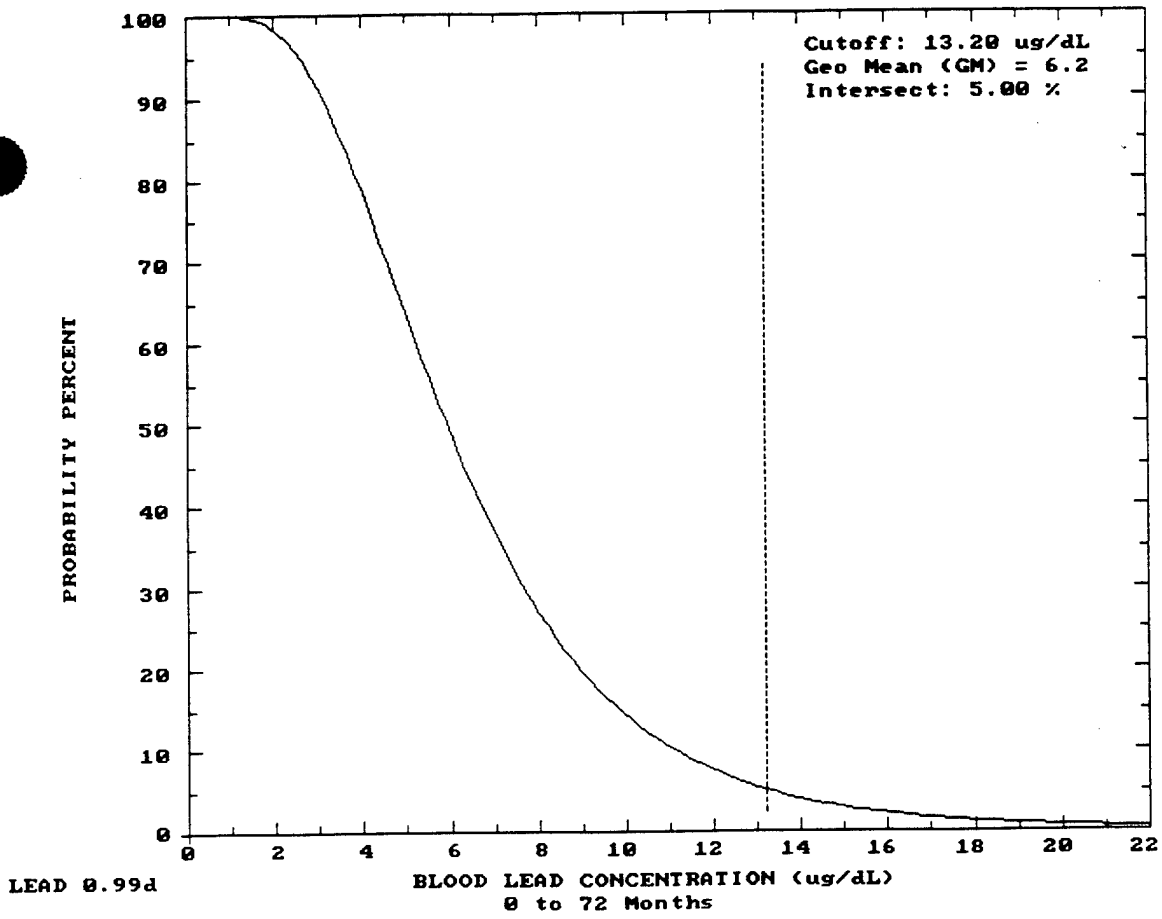
MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	6.5	12.24	9.47
1-2:	7.4	18.08	14.74
2-3:	7.0	18.81	15.03
3-4:	6.6	19.09	15.32
4-5:	5.5	15.61	11.77
5-6:	4.7	14.86	10.74
6-7:	4.2	14.69	10.21

AR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.40	0.35	0.00	0.02
1-2:	2.46	0.85	0.00	0.03
2-3:	2.82	0.90	0.00	0.06

3-4:	2.76	0.94	0.00	0.07
4-5:	2.76	1.01	0.00	0.07
5-6:	2.95	1.08	0.00	0.09
6-7:	3.28	1.11	0.00	0.09


Cutoff: 13.20 ug/dL
Geo Mean (GM) = 6.2
Intersect: 5.00 %
PROBABILITY PERCENT
100
90
80
70
60
50
40
30
20
10
0
0
2
4
6
8
10
12
14
16
18
20
22
BLOOD LEAD CONCENTRATION (ug/dL)
0 to 72 Months
LEAD 0.99d

SWMU 20

TOXICITY INDICIES FOR SELECTION OF COPCs
SWMU 20 - AED DEACTIVATION FURNACE SITE

Compound	Maximum Concentration mg/kg	Percent of Detects	Chronic Oral RfD	Non-carcinogenic Index	Percent of Total	Oral Slope Factor	Carcinogenic Index	Percent of Total	Comments
Antimony	2.03E+02	11	4.00E-04	**5.08E+05**	47.3				
Thallium	2.62E+01	52	8.00E-05	**3.28E+05**	30.5				
Cadmium	1.09E+02	37	1.00E-03	**1.09E+05**	10.1				
Barium	5.60E+03	100	7.00E-02	**8.00E+04**	7.4				
Chromium	1.31E+02	99	5.00E-03	**2.62E+04**	2.4				Carcinogen by inhalation
Zinc	2.84E+03	100	3.00E-01	**9.47E+03**	0.88				
Nickel	1.32E+02	100	2.00E-02	6.60E+03	0.61				
Vanadium	2.32E+01	100	7.00E-03	3.31E+03	0.31				
Manganese	4.51E+02	1	1.40E-01	**3.22E+03**	0.30				More toxic by inhalation
Mercury	3.13E-01	15	3.00E-04	**1.04E+03**	0.097				More toxic by inhalation
Phenanthrene	2.50E+00	6	3.00E-02	8.33E+01	0.008				
Cyanide	1.32E+00	6	2.00E-02	6.60E+01	0.006				
Ethylbenzene	2.00E-03	6	1.00E-01	2.00E-02	0.000002				
Toluene	2.00E-03	6	2.00E-01	1.00E-02	0.000001				
Xylenes	7.00E-03	11	2.00E+00	3.50E-03	0.0000003				
Aluminum	1.45E+04	100							
Copper	2.00E+03	100							
Lead	2.10E+04	99							

Total noncarcinogenic index: 1.07E+06
Total noncarcinogenic index for COPCs: 1.06E+06

Contaminants of potential concern (COPCs) are in bold and underlined.

TEAD-N, SWMU 20 - AED DEACTIVATION FURNACE SITE

RME RISK CALCULATIONS FOR FURNACE WORKERS

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Cadmium	1.2E+01	2.0E-06	8.7E-08	2.0E-08	NA	NA	6.3E+00	NC	NC	1.3E-07	1.3E-07
Chromium(VI)	1.1E+01	1.9E-06	8.3E-08	1.9E-08	NA	NA	4.1E+01	NC	NC	7.9E-07	7.9E-07
Dioxins/Furans	2.0E-07	3.5E-14	4.5E-14	3.5E-16	1.5E+05	1.7E+05	1.5E+05	5.2E-09	7.8E-09	5.2E-11	1.3E-08
							Total Cancer Risk:	5E-09	8E-09	9E-07	9E-07

Chemical	Exposure Point Concentration (mg/kg)	Oral Dose (mg/kg-day)	Dermal Dose (mg/kg-day)	Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Antimony	2.1E+01	1.0E-05	4.5E-07	1.0E-07	4.0E-04	4.0E-06	NA	2.6E-02	1.1E-01	NC	1.4E-01
Barium	5.4E+02	2.6E-04	1.1E-05	2.6E-06	7.0E-02	3.5E-03	1.4E-04	3.8E-03	3.3E-03	1.9E-02	2.6E-02
Cadmium	1.2E+01	5.7E-06	2.4E-07	5.7E-08	1.0E-03	7.0E-05	NA	5.7E-03	3.5E-03	NC	9.1E-03
Chromium(VI)	1.1E+01	5.4E-06	2.3E-07	5.4E-08	5.0E-03	5.5E-04	NA	1.1E-03	4.2E-04	NC	1.5E-03
Chromium(III)	3.3E+01	1.6E-05	7.0E-07	1.6E-07	1.0E+00	4.0E-02	NA	1.6E-05	1.7E-05	NC	3.4E-05
Lead	2.0E+03	9.6E-04	4.1E-05	9.6E-06	NA	NA	NA	NC	NC	NC	NC
Mercury	3.0E-02	1.5E-08	6.3E-10	1.5E-10	3.0E-04	4.5E-05	8.6E-05	4.9E-05	1.4E-05	1.7E-06	6.5E-05
Thallium	8.5E+00	4.1E-06	1.8E-07	4.1E-08	8.0E-05	8.0E-05	NA	5.2E-02	2.2E-03	NC	5.4E-02
Zinc	4.6E+02	2.2E-04	9.6E-06	2.2E-06	3.0E-01	9.0E-02	NA	7.4E-04	1.1E-04	NC	8.5E-04
							Total Hazard Index:	9E-02	1E-01	2E-02	2E-01

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 20 - AED DEACTIVATION FURNACE SITE

RME RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Dermal Slope Factor mg/kg-day)-	Inhalation Slope Factor (mg/kg-day)-1	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Chemical Cancer Risk
Cadmium	6.0E+00	2.0E-07	1.8E-09	8.3E-09	NA	NA	6.3E+00	NC	NC	5.2E-08	5.2E-08
Chromium(VI)	1.1E+01	3.7E-07	3.3E-09	1.5E-08	NA	NA	4.1E+01	NC	NC	6.3E-07	6.3E-07
Dioxins/Furans	2.0E-07	6.7E-15	1.8E-15	2.8E-16	1.5E+05	1.7E+05	1.5E+05	1.0E-09	3.1E-10	4.2E-11	1.4E-09
							Total Cancer Risk:	1E-09	3E-10	7E-07	7E-07

Chemical	Exposure Point Concentration (mg/kg)	Subchronic Oral Dose (mg/kg-day)	Subchronic Dermal Dose (mg/kg-day)	Subchronic Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Antimony	1.2E+01	2.8E-05	2.5E-07	1.2E-06	4.0E-04	4.0E-06	NA	7.1E-02	6.3E-02	NC	1.3E-01
Barium	2.9E+02	6.9E-04	6.2E-06	2.9E-05	7.0E-02	1.4E-03	1.0E-03	9.9E-03	4.4E-03	2.9E-02	4.3E-02
Cadmium	6.0E+00	1.4E-05	1.3E-07	5.8E-07	1.0E-03	7.0E-05	NA	1.4E-02	1.8E-03	NC	1.6E-02
Chromium(VI)	1.1E+01	2.6E-05	2.3E-07	1.1E-06	2.0E-02	2.2E-03	NA	1.3E-03	1.1E-04	NC	1.4E-03
Chromium(III)	2.3E+01	5.4E-05	4.8E-07	2.2E-06	1.0E+00	4.0E-02	NA	5.4E-05	1.2E-05	NC	6.6E-05
Lead	9.6E+02	2.3E-03	2.0E-05	9.4E-05	NA	NA	NA	NC	NC	NC	NC
Mercury	3.8E-02	8.9E-08	8.0E-10	3.7E-09	3.0E-04	4.5E-05	8.5E-05	3.0E-04	1.8E-05	4.4E-05	3.6E-04
Thallium	3.4E-01	8.1E-07	7.2E-09	3.4E-08	8.0E-04	8.0E-04	NA	1.0E-03	9.0E-06	NC	1.0E-03
Zinc	7.4E+00	1.7E-05	1.6E-07	7.2E-07	3.0E-01	9.0E-02	NA	5.8E-05	1.7E-06	NC	5.9E-05
							Total Hazard Index:	1E-01	7E-02	3E-02	2E-01

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 20 - AED DEACTIVATION FURNACE SITE

RME RISK CALCULATIONS FOR FUTURE TEAD-N RESIDENT

Chemical	Exposure Point Concentration (mg/kg)	Soil Lifetime Average Oral Dose (mg/kg-day)	Soil Lifetime Average Dermal Dose (mg/kg-day)	Soil Lifetime Average Inhalation Dose (mg/kg-day)	Produce Lifetime Average Oral Dose (mg/kg-day)	Beef Lifetime Average Oral Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Soil Ingestion Cancer Risk	Soil Dermal Cancer Risk	Soil Inhalation Cancer Risk	Produce Ingestion Cancer Risk	Beef Ingestion Cancer Risk	Total Cancer Risk
Cadmium	1.2E+01	1.8E-05	2.5E-07	5.7E-08	5.7E-04	2.5E-10	NA	NA	6.3E+00	NC	NC	3.6E-07	NC	NC	3.6E-07
Dioxins/Furans	2.0E-07	3.1E-13	1.3E-13	9.9E-16	2.3E-12	1.3E-15	1.5E+05	1.7E+05	1.5E+05	4.7E-08	2.2E-08	1.5E-10	3.4E-07	2.0E-10	4.1E-07
									Total Cancer Risk:	5E-08	2E-08	3E-06	3E-07	2E-10	3E-06

Chemical	Exposure Point Concentration (mg/kg)	Soil Chronic Oral Dose (mg/kg-day)	Soil Chronic Dermal Dose (mg/kg-day)	Soil Chronic Inhalation Dose (mg/kg-day)	Produce Chronic Oral Dose (mg/kg-day)	Beef Chronic Oral Dose (mg/kg-day)	Oral RfD	Dermal RfD	Inhalation RfD	Soil Ingestion Hazard Quotient	Soil Dermal Hazard Quotient	Soil Inhalation Hazard Quotient	Produce Ingestion Hazard Quotient	Beef Ingestion Hazard Quotient	Total Hazard Quotient
Antimony	2.1E+01	2.7E-04	1.8E-06	6.3E-07	1.8E-03	1.0E-08	4.0E-04	4.0E-06	NA	6.8E-01	4.6E-01	NC	4.6E+00	2.6E-05	5.7E+00
Barium	5.4E+02	6.9E-03	4.6E-05	1.6E-05	3.4E-02	3.6E-08	7.0E-02	3.5E-03	1.0E-04	9.9E-02	1.3E-02	1.6E-01	4.8E-01	5.1E-07	7.5E-01
Cadmium	1.2E+01	1.5E-04	9.9E-07	3.4E-07	3.0E-03	1.5E-09	1.0E-03	7.0E-05	NA	1.5E-01	1.4E-02	NC	3.0E+00	1.5E-06	3.2E+00
Chromium (VI)	1.1E+01	1.4E-04	9.4E-07	3.3E-07	4.9E-05	6.6E-09	5.0E-03	5.5E-04	NA	2.8E-02	1.7E-03	NC	9.8E-03	1.3E-06	4.0E-02
Chromium (III)	3.3E+01	4.2E-04	2.8E-06	9.8E-07	1.5E-04	2.0E-08	1.0E+00	4.0E-02	NA	4.2E-04	7.1E-05	NC	1.5E-04	2.0E-08	6.4E-04
Lead	2.0E+03	2.5E-02	1.7E-04	5.8E-05	4.0E-02	4.5E-08	NA	NA	NA	NC	NC	NC	NC	NC	NC
Mercury	3.0E-02	3.8E-07	2.6E-09	8.9E-10	1.2E-06	4.0E-12	3.0E-04	4.5E-05	8.6E-05	1.3E-03	5.7E-05	1.0E-05	4.1E-03	1.3E-08	5.5E-03
Thallium	8.5E+00	1.1E-04	7.2E-07	2.5E-07	1.4E-05	1.1E-07	8.0E-05	8.0E-05	NA	1.4E+00	9.0E-03	NC	1.8E-01	1.3E-03	1.5E+00
Zinc	4.6E+02	5.8E-03	3.9E-05	1.3E-05	NC	1.4E-05	3.0E-01	9.0E-02	NA	1.9E-02	4.3E-04	NC	NC	4.7E-05	2.0E-02
									Total Hazard Index:	2E+00	5E-01	2E-01	8E+00	1E-03	1E+01

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 20 DEPOT WORKER

INPUT		OUTPUT					
MEDIUM	LEVEL			percentiles			
			50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.1						
LEAD IN SOIL (ug/g)	1959.1	BLOOD Pb, ADULT(µg/dL)	3.3	5.2	5.8	6.8	7.4
LEAD IN WATER (ug/l)	15						
PLANT UPTAKE? 1=YES 0=NO	0						
AIRBORNE DUST (ug/m^3)	50						

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant			Concentration in Medium		Contact Rate			percent of total
SOIL CONTACT:	0.38	=	1E-04	(ug/dl)/(ug/day)	*	1959	ug/g *	1.85	g soil/day	(5 g/m^2 * 0.37 m^2)	12%
SOIL INGESTION:	0.86	=	0.018	(ug/dl)/(ug/day)	*	1959	ug/g *	0.025	g soil/day		26%
INHALATION:	0.32	=	1.64	(ug/dl)/(ug/m^3)	*	0.20	ug/m^3				10%
WATER INGESTION:	0.84	=	0.04	(ug/dl)/(ug/day)	*	15	ug/l *	1.4	l water/day		26%
FOOD INGESTION:	0.88	=	0.04	(ug/dl)/(ug/day)	*	10.0	ug Pb/kg diet *	2.2	kg diet/day		27%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD	=	.945 * 10 + 0.055 * Pb in produce (ug/kg) =		10.0	ug/kg
LEAD IN PRODUCE	=	10 ug/kg or 0.00045 * soil lead	d	=	10.0	ug/kg

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 20 CONSTRUCTION WORKER

INPUT		OUTPUT						
MEDIUM	LEVEL			percentiles				
LEAD IN AIR (ug/m^3)	0.1		50th	90th	95th	98th	99th	
LEAD IN SOIL (ug/g)	961.2	BLOOD Pb, ADULT(µg/dL)	3.0	4.7	5.3	6.2	6.8	
LEAD IN WATER (ug/l)	15							
PLANT UPTAKE? 1=YES 0=NO	0							
AIRBORNE DUST (ug/m^3)	50							

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	0.19	=	1E-04 (ug/dl)/(ug/day)	*	961	ug/g *	1.85	g soil/day (5 g/m^2 * 0.37 m^2)	6%
SOIL INGESTION:	0.85	=	0.018 (ug/dl)/(ug/day)	*	961	ug/g *	0.05	g soil/day	28%
INHALATION:	0.24	=	1.64 (ug/dl)/(ug/m^3)	*	0.15	ug/m^3			8%
WATER INGESTION:	0.84	=	0.04 (ug/dl)/(ug/day)	*	15	ug/l *	1.4	l water/day	28%
FOOD INGESTION:	0.88	=	0.04 (ug/dl)/(ug/day)	*	10.0	ug Pb/kg diet *	2.2	kg diet/day	29%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD	=	.945 * 10 + 0.055 * Pb in produce (ug/kg) =			10.0	ug/kg
LEAD IN PRODUCE	=	10 ug/kg or 0.00045 * soil lead	d	=	10.0	ug/kg

OUTPUT FROM EPA IEUBK LEAD 0.5 MODEL FOR CHILDREN (SWMU 20)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 . DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	946.1	200.0
1-2	946.1	200.0
2-3	946.1	200.0
3-4	946.1	200.0
4-5	946.1	200.0
5-6	946.1	200.0
6-7	946.1	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

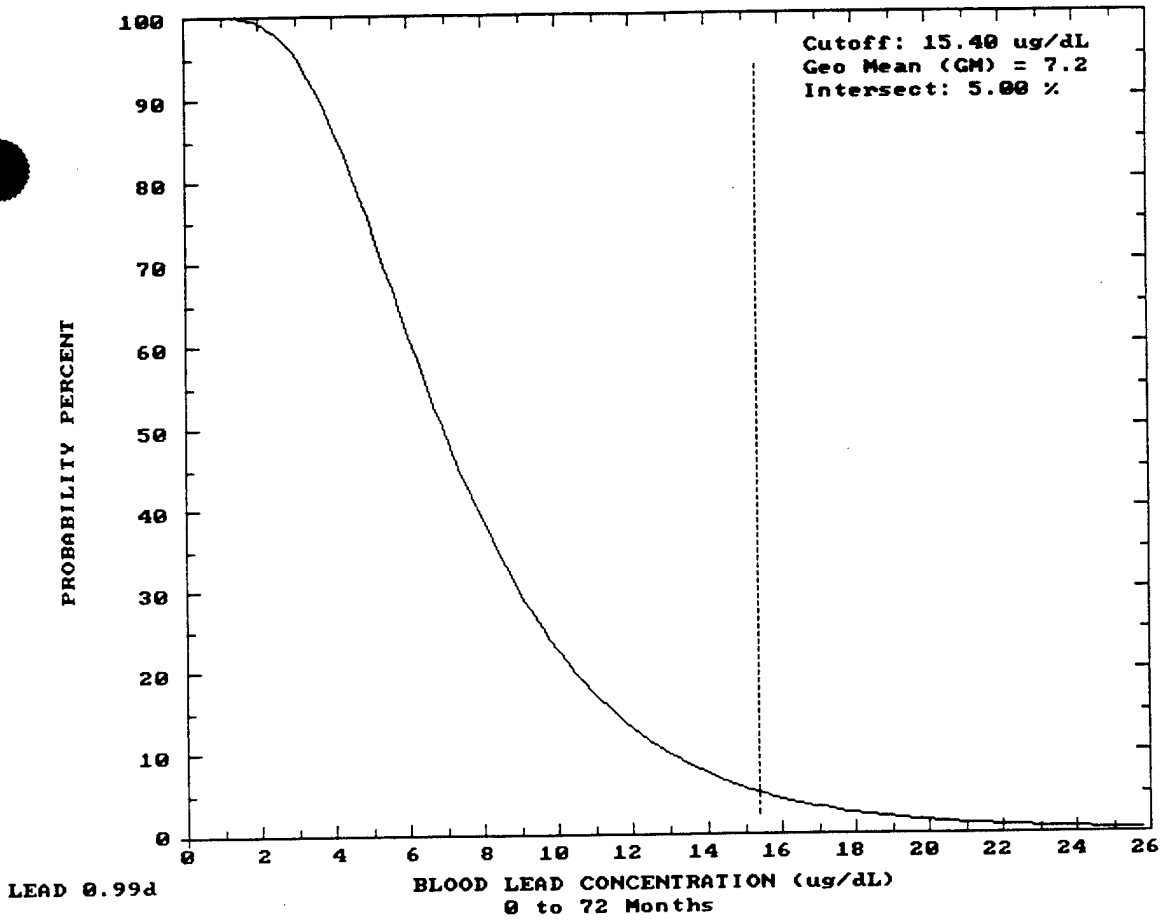
CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	7.6	14.28	11.58
1-2:	8.7	21.19	17.94
2-3:	8.1	22.04	18.36
3-4:	7.8	22.45	18.77
4-5:	6.5	18.30	14.53
5-6:	5.5	17.36	13.29
6-7:	4.9	17.09	12.66

AR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.34	0.34	0.00	0.02
1-2:	2.39	0.83	0.00	0.03
2-3:	2.75	0.88	0.00	0.06

3-4:	2.70	0.92	0.00	0.07
4-5:	2.72	0.99	0.00	0.07
5-6:	2.91	1.07	0.00	0.09
6-7:	3.24	1.09	0.00	0.09

3-4:	2.70	0.92	0.00	0.07
4-5:	2.72	0.99	0.00	0.07
5-6:	2.91	1.07	0.00	0.09
6-7:	3.24	1.09	0.00	0.09


Cutoff: 15.40 ug/dL
Geo Mean (GM) = 7.2
Intersect: 5.00 %
PROBABILITY PERCENT
100
90
80
70
60
50
40
30
20
10
0
0
2
4
6
8
10
12
14
16
18
20
22
24
26
BLOOD LEAD CONCENTRATION (ug/dL)
0 to 72 Months
LEAD 0.99d

SWMU 21

TOXICITY INDICIES SCREEN FOR SELECTION OF COPCs
SWMU 21 - AED DEACTIVATION FURNACE

Compound	Maximum Concentration mg/kg	Percent of Detects	Chronic Oral RfD	Non-carcinogenic Index	Percent of Total	Oral Slope Factor	Carcinogenic Index	Percent of Total	Comments
Antimony	7.88E+02	100	4.00E-04	**1.97E+06**	44.7				
Thallium	8.28E+01	100	8.00E-05	**1.04E+06**	23.5				
Cadmium	9.04E+02	100	1.00E-03	**9.04E+05**	20.5				
Barium	1.20E+04	100	7.00E-02	**1.71E+05**	3.9				
Arsenic	4.30E+01	100	3.00E-04	**1.43E+05**	3.2	1.80E+00	**7.74E+01**	78.4	
Zinc	1.90E+04	100	3.00E-01	**6.33E+04**	1.4				
Chromium	2.48E+02	100	5.00E-03	**4.96E+04**	1.1				
Cyanide	7.35E+02	30	2.00E-02	3.68E+04	0.8				
Manganese	2.30E+03	100	1.40E-01	**1.64E+04**	0.4				More toxic by inhalation
Nickel	2.54E+02	100	2.00E-02	1.27E+04	0.29				
2,4,6-Trinitrotoluene	2.01E+00	30	5.00E-04	4.02E+03	0.09	3.00E-02	**6.03E-02**	0.1	
Silver	1.40E+01	100	5.00E-03	2.80E+03	0.06				
Beryllium	3.80E+00	90	5.00E-03	7.60E+02	0.02	4.30E+00	**1.63E+01**	16.5	
2,4-Dinitrotoluene	1.35E+00	40	2.00E-03	6.75E+02	0.02	6.80E-01	9.18E-01	0.9	
Selenium	1.83E+00	100	5.00E-03	3.66E+02	0.008				
Mercury	9.90E-02	50	3.00E-04	**3.30E+02**	0.007				
Napthalene	2.00E-01	10	3.00E-02	6.67E+00	0.0002				
Phenanthrene	2.00E-01	10	3.00E-02	6.67E+00	0.0002				
Pyrene	2.00E-01	10	3.00E-02	6.67E+00	0.0002				
Ethylbenzene	6.00E-03	90	1.00E-01	6.00E-02	0.000001				
Xylenes	2.50E-02	100	2.00E+00	1.25E-02	0.0000003				
Dioxins/Furans (a)	2.70E-05	100				1.50E+05	**4.05E+00**	4.1	
Aluminum	2.60E+04	100							
Cobalt	1.50E+01	100							
Copper	2.90E+04	100							
Lead	6.30E+04	100							
n-Nitrosodiphenylamine	2.00E+00	20				4.90E-03	9.80E-03	0.01	
			Total noncarcinogenic index:	4.41E+06			Total carcinogenic index:	9.88E+01	
			Total noncarcinogenic index for COPCs:	4.35E+06			Total carcinogenic index for COPCs:	9.78E+01	

Contaminants of potential concern (COPC) are in bold and underlined.

(a) Concentration based on toxicity equivalence factor

TEAD-N, SWMU 21 - DEACTIVATION FURNACE BUILDING

RME RISK CALCULATIONS FOR FURNACE WORKERS

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Arsenic	1.7E+01	3.0E-06	1.3E-07	3.0E-08	1.8E+00	1.8E+00	1.5E+01	5.5E-06	2.4E-07	4.6E-07	6.2E-06
Beryllium	1.6E+00	2.8E-07	1.2E-08	2.8E-09	4.3E+00	8.6E+01	8.4E+00	1.2E-06	1.1E-06	2.4E-08	2.3E-06
Cadmium	4.1E+02	7.2E-05	3.1E-06	7.2E-07	NA	NA	6.3E+00	NC	NC	4.5E-06	4.5E-06
Chromium(VI)	6.4E+00	1.1E-06	4.8E-08	1.1E-08	NA	NA	4.1E+01	NC	NC	4.6E-07	4.6E-07
Dioxins/Furans	9.1E-06	1.6E-12	2.1E-12	1.6E-14	1.5E+05	1.7E+05	1.5E+05	2.4E-07	3.5E-07	2.4E-09	6.0E-07
2,4,6-Trinitrotoluene	9.0E-01	1.6E-07	2.0E-07	1.6E-09	3.0E-02	3.8E-02	NA	4.7E-09	7.6E-09	NC	1.2E-08
							Total Cancer Risk:	7E-06	2E-06	5E-06	1E-05

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg-day)	Chronic Dermal Dose (mg/kg-day)	Chronic Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Antimony	3.0E+02	1.5E-04	6.4E-06	1.5E-06	4.0E-04	4.0E-06	NA	3.7E-01	1.6E+00	NC	2.0E+00
Arsenic	1.7E+01	8.5E-06	3.7E-07	8.5E-08	3.0E-04	3.0E-04	NA	2.8E-02	1.2E-03	NC	3.0E-02
Barium	5.4E+03	2.7E-03	1.1E-04	2.7E-05	7.0E-02	3.5E-03	1.4E-04	3.8E-02	3.3E-02	1.9E-01	2.6E-01
Beryllium	1.6E+00	8.0E-07	3.4E-08	8.0E-09	5.0E-03	2.5E-04	NA	1.6E-04	1.4E-04	NC	3.0E-04
Cadmium	4.1E+02	2.0E-04	8.7E-06	2.0E-06	1.0E-03	7.0E-05	NA	2.0E-01	1.2E-01	NC	3.2E-01
Chromium(VI)	6.4E+00	3.1E-06	1.3E-07	3.1E-08	5.0E-03	5.5E-04	NA	6.3E-04	2.4E-04	NC	8.7E-04
Chromium(III)	1.2E+02	5.9E-05	2.6E-06	5.9E-07	1.0E+00	4.0E-02	NA	5.9E-05	6.4E-05	NC	1.2E-04
Lead	2.5E+04	1.2E-02	5.3E-04	1.2E-04	NA	NA	NA	NC	NC	NC	NC
Manganese	8.7E+02	4.3E-04	1.8E-05	4.3E-06	1.4E-01	4.2E-03	1.4E-05	3.0E-03	4.4E-03	3.0E-01	3.0E-01
Mercury	6.4E-02	3.1E-08	1.3E-09	3.1E-10	3.0E-04	4.5E-05	8.6E-05	1.0E-04	3.0E-05	3.6E-06	1.4E-04
Thallium	4.6E+01	2.3E-05	9.7E-07	2.3E-07	8.0E-05	8.0E-05	NA	2.8E-01	1.2E-02	NC	3.0E-01
Zinc	1.1E+04	5.4E-03	2.3E-04	5.4E-05	3.0E-01	9.0E-02	NA	1.8E-02	2.6E-03	NC	2.1E-02
2,4,6-Trinitrotoluene	9.0E-01	4.4E-07	5.7E-07	4.4E-09	5.0E-04	4.0E-04	NA	8.8E-04	1.4E-03	NC	2.3E-03
							Total Hazard Index:	9E-01	2E+00	5E-01	3E+00

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 21 - DEACTIVATION FURNACE

RME RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Dermal Slope Factor mg/kg-day)-	Inhalation Slope Factor (mg/kg-day)-1	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Chemical Cancer Risk
Arsenic	1.7E+01	5.8E-07	5.2E-09	2.4E-08	1.8E+00	1.8E+00	1.5E+01	1.1E-06	9.4E-09	3.7E-07	1.4E-06
Beryllium	1.6E+00	5.5E-08	4.9E-10	2.3E-09	4.3E+00	8.6E+01	8.4E+00	2.3E-07	4.2E-08	1.9E-08	3.0E-07
Cadmium	4.1E+02	1.4E-05	1.2E-07	5.8E-07	NA	NA	6.3E+00	NC	NC	3.6E-06	3.6E-06
Chromium(VI)	6.4E+00	2.1E-07	1.9E-09	8.9E-09	NA	NA	4.1E+01	NC	NC	3.7E-07	3.7E-07
Dioxins/Furans	9.1E-06	3.1E-13	8.2E-14	1.3E-14	1.5E+05	1.7E+05	1.5E+05	4.6E-08	1.4E-08	1.9E-09	6.2E-08
2,4,6-Trinitrotoluene	9.0E-01	3.0E-08	8.1E-09	1.3E-09	3.0E-02	3.8E-02	NA	9.1E-10	3.0E-10	NC	1.2E-09
							Total Cancer Risk:	1E-06	7E-08	4E-06	6E-06

Chemical	Exposure Point Concentration (mg/kg)	Subchronic Oral Dose (mg/kg-day)	Subchronic Dermal Dose (mg/kg-day)	Subchronic Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Antimony	3.0E+02	7.1E-04	6.4E-06	3.0E-05	4.0E-04	4.0E-06	NA	1.8E+00	1.6E+00	NC	3.4E+00
Arsenic	1.7E+01	4.1E-05	3.7E-07	1.7E-06	3.0E-04	3.0E-04	NA	1.4E-01	1.2E-03	NC	1.4E-01
Barium	5.4E+03	1.3E-02	1.1E-04	5.3E-04	7.0E-02	3.5E-03	1.4E-03	1.8E-01	3.3E-02	3.8E-01	5.9E-01
Beryllium	1.6E+00	3.8E-06	3.4E-08	1.6E-07	5.0E-03	2.5E-04	NA	7.6E-04	1.4E-04	NC	9.0E-04
Cadmium	4.1E+02	9.7E-04	8.7E-06	4.0E-05	1.0E-03	7.0E-05	NA	9.7E-01	1.2E-01	NC	1.1E+00
Chromium(VI)	6.4E+00	1.5E-05	1.3E-07	6.3E-07	2.0E-02	2.2E-03	NA	7.5E-04	6.1E-05	NC	8.1E-04
Chromium(III)	1.2E+02	2.9E-04	2.6E-06	1.2E-05	1.0E+00	4.0E-02	NA	2.9E-04	6.4E-05	NC	3.5E-04
Lead	2.5E+04	5.9E-02	5.3E-04	2.4E-03	NA	NA	NA	NC	NC	NC	NC
Manganese	8.7E+02	2.0E-03	1.8E-05	8.5E-05	1.4E-01	4.2E-03	1.4E-05	1.5E-02	4.4E-03	5.9E+00	6.0E+00
Mercury	6.4E-02	1.5E-07	1.3E-09	6.3E-09	3.0E-04	4.5E-05	8.6E-05	5.0E-04	3.0E-05	7.3E-05	6.0E-04
Thallium	4.6E+01	1.1E-04	9.7E-07	4.5E-06	8.0E-04	8.0E-04	NA	1.4E-01	1.2E-03	NC	1.4E-01
Zinc	1.1E+04	2.6E-02	2.3E-04	1.1E-03	3.0E-01	9.0E-02	NA	8.6E-02	2.6E-03	NC	8.9E-02
2,4,6-Trinitrotoluene	9.0E-01	2.1E-06	5.7E-07	8.8E-08	5.0E-04	4.0E-04	NA	4.2E-03	1.4E-03	NC	5.6E-03
							Total Hazard Index:	3E+00	2E+00	6E+00	1E+01

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 21 - DEACTIVATION FURNACE

RME RISK CALCULATIONS FOR FUTURE TEAD-N RESIDENT

Chemical	Exposure Point Concentration (mg/kg)	Soil			Produce	Beef				Soil			Produce	Beef	
		Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Oral Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Ingestion Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Ingestion Cancer Risk	Ingestion Cancer Risk	Total Cancer Risk
Arsenic	1.7E+01	2.7E-05	3.7E-07	8.6E-08	5.7E-05	2.0E-10	1.8E+00	1.8E+00	1.5E+01	4.9E-05	6.7E-07	1.3E-06	1.0E-04	3.6E-10	1.5E-04
Beryllium	1.6E+00	2.5E-06	3.5E-08	8.1E-09	1.3E-06	1.3E-11	4.3E+00	8.6E+01	8.4E+00	1.1E-05	3.0E-06	6.8E-08	5.7E-06	5.7E-11	2.0E-05
Cadmium	4.1E+02	6.4E-04	8.8E-06	2.0E-06	2.0E-02	1.4E-09	NA	NA	6.3E+00	NC	NC	1.3E-05	NC	NC	1.3E-05
2,4,6-Trinitrotoluene	9.1E-06	1.4E-11	5.8E-12	4.5E-14	9.7E-08	2.7E-18	1.5E+05	1.7E+05	1.5E+05	2.1E-06	1.0E-06	6.8E-09	1.4E-02	4.1E-13	1.5E-02
Dioxins/Furans	9.0E-01	1.4E-06	5.8E-07	4.5E-09	1.0E-05	9.7E-10	3.0E-02	3.8E-02	NA	4.2E-08	2.2E-08	NC	3.1E-07	2.9E-11	3.7E-07
									Total Cancer Risk:	6E-05	5E-06	2E-05	1E-02	4E-10	1E-02

Chemical	Exposure Point Concentration (mg/kg)	Soil			Produce	Beef				Soil			Produce	Beef	
		Chronic Oral Dose (mg/kg-day)	Chronic Dermal Dose (mg/kg-day)	Chronic Inhalation Dose (mg/kg-day)	Chronic Oral Dose (mg/kg-day)	Chronic Oral Dose (mg/kg-day)	Oral RfD	Dermal RfD	Inhalation RfD	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Ingestion Hazard Quotient	Ingestion Hazard Quotient	Total Hazard Quotient
Antimony	3.0E+02	3.9E-03	2.6E-05	9.0E-06	2.6E-02	2.4E-08	4.0E-04	4.0E-06	NA	9.7E+00	6.5E+00	NC	6.6E+01	5.9E-05	8.2E+01
Arsenic	1.7E+01	2.2E-04	1.5E-06	5.2E-07	3.0E-04	1.3E-09	3.0E-04	3.0E-04	NA	7.4E-01	5.0E-03	NC	1.0E+00	4.2E-06	1.7E+00
Barium	5.4E+03	6.9E-02	4.6E-04	1.6E-04	3.4E-01	5.8E-08	7.0E-02	3.5E-03	1.0E-04	9.9E-01	1.3E-01	1.6E+00	4.8E+00	8.2E-07	7.6E+00
Beryllium	1.6E+00	2.1E-05	1.4E-07	4.8E-08	7.0E-06	8.3E-11	5.0E-03	2.5E-04	NA	4.2E-03	5.6E-04	NC	1.4E-03	1.7E-08	6.1E-03
Cadmium	4.1E+02	5.3E-03	3.5E-05	1.2E-05	1.1E-01	8.9E-09	1.0E-03	7.0E-05	NA	5.3E+00	5.0E-01	NC	1.1E+02	8.9E-06	1.1E+02
Chromium (VI)	6.4E+00	8.2E-05	5.5E-07	1.9E-07	2.8E-05	6.2E-10	5.0E-03	5.5E-04	NA	1.6E-02	9.9E-04	NC	5.7E-03	1.2E-07	2.3E-02
Chromium (III)	1.2E+02	1.6E-03	1.0E-05	3.6E-06	5.4E-04	1.2E-08	1.0E+00	4.0E-02	NA	1.6E-03	2.6E-04	NC	5.4E-04	1.2E-08	2.4E-03
Lead	2.5E+04	3.2E-01	2.1E-03	7.4E-04	5.1E-01	9.4E-08	NA	NA	NA	NC	NC	NC	NC	NC	NC
Manganese	8.7E+02	1.1E-02	7.4E-05	2.6E-05	9.8E-02	2.9E-08	1.4E-01	4.2E-03	1.4E-05	7.9E-02	1.8E-02	1.8E+00	7.0E-01	2.1E-07	2.6E+00
Mercury	6.4E-02	8.2E-07	5.5E-09	1.9E-09	2.6E-06	1.4E-12	3.0E-04	4.5E-05	8.6E-05	2.7E-03	1.2E-04	2.2E-05	8.8E-03	4.6E-09	1.2E-02
Thallium	4.6E+01	5.9E-04	4.0E-06	1.4E-06	7.7E-05	9.3E-08	8.0E-05	8.0E-05	NA	7.4E+00	4.9E-02	NC	9.6E-01	1.2E-03	8.4E+00
Zinc	1.1E+04	1.4E-01	9.4E-04	3.3E-04	NC	5.5E-05	3.0E-01	9.0E-02	NA	4.7E-01	1.0E-02	NC	NC	1.8E-04	4.8E-01
2,4,6-Trinitrotoluene	9.1E-06	1.2E-10	2.3E-11	2.7E-13	5.1E-07	1.7E-17	NA	NA	NA	NC	NC	NC	NC	NC	NC
									Total Hazard Index:	2E+01	7E+00	3E+00	2E+02	1E-03	2E+02

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 21 DEPOT WORKER

INPUT		OUTPUT						
MEDIUM	LEVEL			percentiles				
				50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.1							
LEAD IN SOIL (ug/g)	25037	BLOOD Pb, ADULT(µg/dL)		19.8	31.1	35.3	40.8	44.9
LEAD IN WATER (ug/l)	15							
PLANT UPTAKE? 1=YES 0=NO	0							
AIRBORNE DUST (ug/m^3)	50							

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	4.89	=	1E-04 (ug/dl)/(ug/day)	*	25037 ug/g	*	1.85	g soil/day (5 g/m^2 * 0.37 m^2)	25%
SOIL INGESTION:	11.02	=	0.018 (ug/dl)/(ug/day)	*	25037 ug/g	*	0.025	g soil/day	56%
INHALATION:	2.22	=	1.64 (ug/dl)/(ug/m^3)	*	1.35 ug/m^3				11%
WATER INGESTION:	0.84	=	0.04 (ug/dl)/(ug/day)	*	15 ug/l	*	1.4	l water/day	4%
FOOD INGESTION:	0.88	=	0.04 (ug/dl)/(ug/day)	*	10.0 ug Pb/kg diet	*	2.2	kg diet/day	4%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD	=	.945 * 10 + 0.055 * Pb in produce (ug/kg) =		10.0	ug/kg
LEAD IN PRODUCE	=	10 ug/kg or 0.00045 * soil lead	d =	10.0	ug/kg

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 21 CONSTRUCTION WORKER

INPUT		OUTPUT					
MEDIUM	LEVEL		percentiles				
LEAD IN AIR (ug/m^3)	0.1		50th	90th	95th	98th	99th
LEAD IN SOIL (ug/g)	25037	BLOOD Pb, ADULT(µg/dL)	30.9	48.4	54.8	63.4	69.9
LEAD IN WATER (ug/l)	15						
PLANT UPTAKE? 1=YES 0=NO	0						
AIRBORNE DUST (ug/m^3)	50						

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	4.89	=	1E-04 (ug/dl)/(ug/day)	*	25037	ug/g *	1.85	g soil/day (5 g/m^2 * 0.37 m^2)	16%
SOIL INGESTION:	22.03	=	0.018 (ug/dl)/(ug/day)	*	25037	ug/g *	0.05	g soil/day	71%
INHALATION:	2.22	=	1.64 (ug/dl)/(ug/m^3)	*	1.35	ug/m^3			7%
WATER INGESTION:	0.84	=	0.04 (ug/dl)/(ug/day)	*	15	ug/l *	1.4	l water/day	3%
FOOD INGESTION:	0.88	=	0.04 (ug/dl)/(ug/day)	*	10.0	ug Pb/kg diet *	2.2	kg diet/day	3%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD	=	.945 * 10 + 0.055 * Pb in produce (ug/kg) =			10.0	ug/kg
LEAD IN PRODUCE	=	10 ug/kg or 0.00045 * soil lead	d	=	10.0	ug/kg

OUTPUT FROM EPA IEUBK LEAD 0.5 MODEL FOR CHILDREN (SWMU 21)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	14202.0	200.0
1-2	14202.0	200.0
2-3	14202.0	200.0
3-4	14202.0	200.0
4-5	14202.0	200.0
5-6	14202.0	200.0
6-7	14202.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

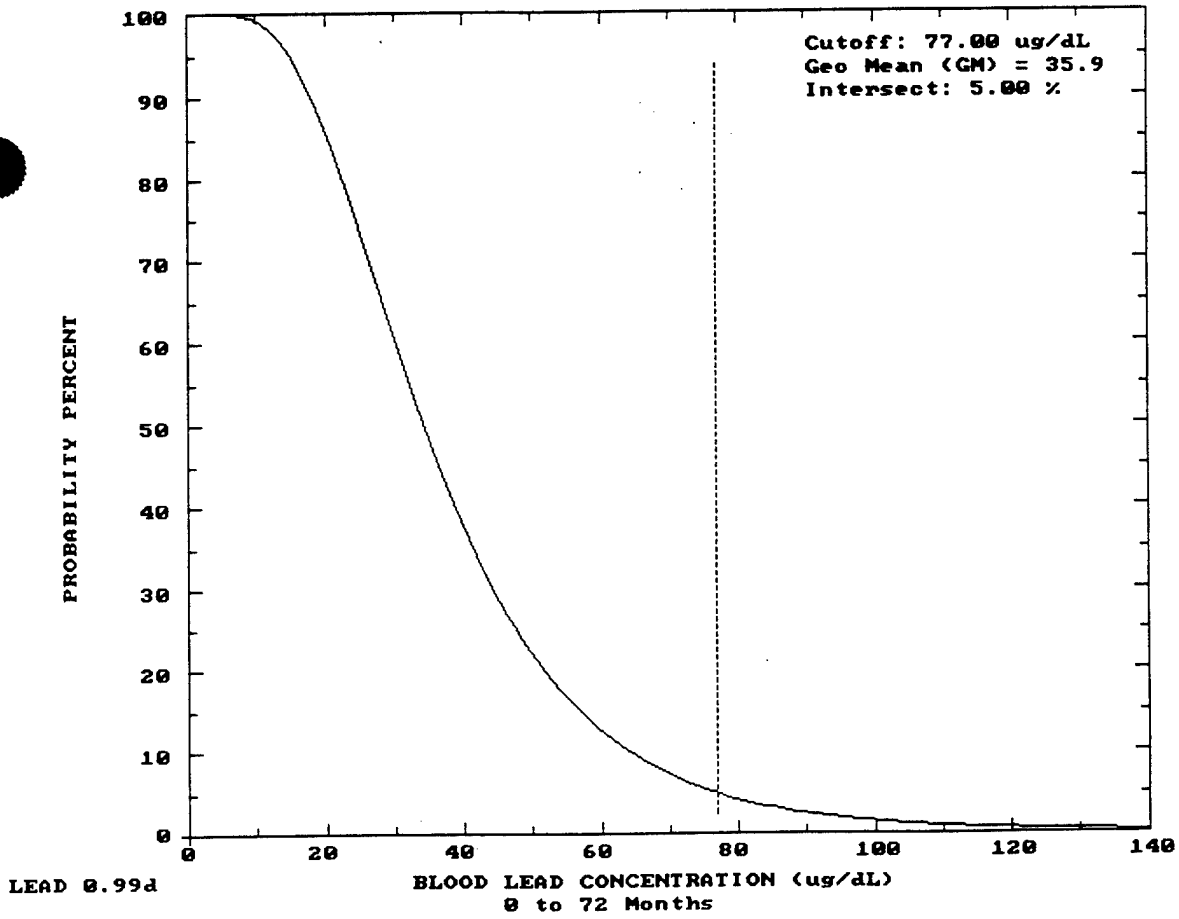
MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	35.8	74.11	72.70
1-2:	41.0	108.59	106.97
2-3:	39.2	115.59	113.67
3-4:	39.0	122.70	120.72
4-5:	34.7	107.76	105.47
5-6:	31.0	105.22	102.60
6-7:	28.3	104.48	101.52

AIR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	1.21	0.18	0.00	0.02
1-2:	1.17	0.41	0.00	0.03
2-3:	1.40	0.45	0.00	0.06

3-4:	1.43	0.49	0.00	0.07
4-5:	1.63	0.59	0.00	0.07
5-6:	1.85	0.68	0.00	0.09
6-7:	2.14	0.72	0.00	0.09


Cutoff: 77.00 ug/dL
Geo Mean (GM) = 35.9
Intersect: 5.00 %
PROBABILITY PERCENT
100
90
80
70
60
50
40
30
20
10
0
0
20
40
60
80
100
120
140
LEAD 0.99d
BLOOD LEAD CONCENTRATION (ug/dL)
0 to 72 Months

SWMU 34

TOXICITY INDICIES SCREEN FOR SELECTION OF COPCs
SWMU 34 - PESTICIDE STORAGE AREA

Compound	Maximum Concentration (mg/kg)	Percent of Detects	Chronic Oral RfD	Non-carcinogenic Index	Percent of Total	Oral Slope Factor	Carcinogenic Index	Percent of Total	Comments
p,p-DDT	1.60E+02	58	5.00E-04	**3.20E+05**	42.3	3.40E-01	**5.44E+01**	39.0	
Thallium	1.99E+01	82	8.00E-05	**2.49E+05**	32.9				
Arsenic	4.20E+01	100	3.00E-04	**1.40E+05**	18.5	1.80E+00	**7.56E+01**	54.2	
Endrin	4.50E+00	16	3.00E-04	**1.50E+04**	2.0				
Cadmium	1.16E+01	24	1.00E-03	**1.16E+04**	1.5				
2,4-D	9.90E+01	83	1.00E-02	**9.90E+03**	1.3				
Nickel	1.84E+02	100	2.00E-02	**9.18E+03**	1.2				
Dieldrin	5.35E-02	8	5.00E-05	1.07E+03	0.14	1.60E+01	8.56E-01	0.6	
Lindane	7.10E-02	13	3.00E-04	2.37E+02	0.03				
Mercury	5.00E-02	5	3.00E-04	**1.67E+02**	0.02				More toxic by inhalation
Cyanide	2.88E+00	17	2.00E-02	1.44E+02	0.02				
Selenium	6.18E-01	50	5.00E-03	1.24E+02	0.02				
Chromium	9.69E+01	100	1.00E+00	9.69E+01	0.01				Carcinogenic by inhalation
Heptachlor	2.10E-02	3	5.00E-04	4.20E+01	0.01	4.50E+00	9.45E-02	0.1	
p,p-DDE	2.40E+01	58				3.40E-01	**8.16E+00**	5.9	
p,p-DDD	1.53E+00	21				2.40E-01	3.67E-01	0.3	
Lead	1.12E+03	74							
				Total noncarcinogenic index:	7.56E+05		Total carcinogenic index:	1.39E+02	
				Total noncarcinogenic index for COPCs:	7.55E+05		Total carcinogenic index for COPCs:	1.38E+02	

Contaminants of potential concern (COPCs) are in bold and underlined.

TEAD-N, SWMU 34 - PESTICIDE STORAGE AND HANDLING AREA

RME RISK CALCULATIONS FOR DEPOT PERSONNEL

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Arsenic	1.6E+01	2.8E-06	1.2E-07	2.8E-08	1.8E+00	1.8E+00	1.5E+01	5.1E-06	2.2E-07	4.3E-07	5.7E-06
Cadmium	2.7E+00	4.8E-07	2.0E-08	4.8E-09	NA	NA	6.3E+00	NC	NC	3.0E-08	3.0E-08
DDE	4.5E+00	7.9E-07	1.0E-06	7.9E-09	3.4E-01	3.8E-01	3.4E-01	2.7E-07	3.9E-07	2.7E-09	6.6E-07
DDT	2.7E+01	4.7E-06	6.1E-06	4.7E-08	3.4E-01	6.8E-01	3.4E-01	1.6E-06	4.2E-06	1.6E-08	5.8E-06
							Total Cancer Risk:	7E-06	5E-06	5E-07	1E-05

Chemical	Exposure Point Concentration (mg/kg)	Oral Dose (mg/kg-day)	Dermal Dose (mg/kg-day)	Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Arsenic	1.6E+01	7.9E-06	3.4E-07	7.9E-08	3.0E-04	3.0E-04	NA	2.6E-02	1.1E-03	NC	2.8E-02
Cadmium	2.7E+00	1.3E-06	5.7E-08	1.3E-08	1.0E-03	7.0E-05	NA	1.3E-03	8.2E-04	NC	2.1E-03
Chromium(III)	1.7E+01	8.3E-06	3.6E-07	8.3E-08	1.0E+00	4.0E-02	NA	8.3E-06	8.9E-06	NC	1.7E-05
Lead	2.4E+02	1.2E-04	5.1E-06	1.2E-06	NA	NA	NA	NC	NC	NC	NC
Mercury	2.8E-02	1.4E-08	5.9E-10	1.4E-10	3.0E-04	4.5E-05	8.6E-05	4.6E-05	1.3E-05	1.6E-06	6.0E-05
Nickel	1.5E+01	7.1E-06	3.1E-07	7.1E-08	2.0E-02	2.0E-03	NA	3.5E-04	1.5E-04	NC	5.1E-04
Thallium	1.2E+01	5.8E-06	2.5E-07	5.8E-08	8.0E-05	8.0E-05	NA	7.2E-02	3.1E-03	NC	7.5E-02
24D	5.0E+01	2.4E-05	3.1E-05	2.4E-07	1.0E-02	5.0E-03	NA	2.4E-03	6.3E-03	NC	8.7E-03
DDE	4.5E+00	2.2E-06	2.9E-06	2.2E-08	NA	NA	NA	NC	NC	NC	NC
DDT	2.7E+01	1.3E-05	1.7E-05	1.3E-07	5.0E-04	2.5E-04	NA	2.7E-02	6.9E-02	NC	9.5E-02
Endrin	8.6E-01	4.2E-07	5.4E-07	4.2E-09	3.0E-04	1.5E-04	NA	1.4E-03	3.6E-03	NC	5.0E-03
							Total Hazard Index:	1E-01	8E-02	2E-06	2E-01

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 34 - PESTICIDE STORAGE AND HANDLING AREA

CTE RISK CALCULATIONS FOR DEPOT PERSONNEL

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Arsenic	1.6E+01	2.5E-07	3.8E-09	2.0E-11	1.8E+00	1.8E+00	1.5E+01	4.5E-07	6.8E-09	3.0E-10	4.5E-07
Cadmium	2.7E+00	4.2E-08	6.4E-10	3.3E-12	NA	NA	6.3E+00	NC	NC	2.1E-11	2.1E-11
DDE	4.5E+00	6.9E-08	3.2E-08	5.6E-12	3.4E-01	3.8E-01	3.4E-01	2.4E-08	1.2E-08	1.9E-12	3.6E-08
DDT	2.7E+01	4.2E-07	1.9E-07	3.3E-11	3.4E-01	6.8E-01	3.4E-01	1.4E-07	1.3E-07	1.1E-11	2.7E-07
							Total Cancer Risk:	6E-07	1E-07	3E-10	8E-07

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg-day)	Chronic Dermal Dose (mg/kg-day)	Chronic Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Arsenic	1.6E+01	3.5E-06	5.3E-08	2.8E-10	3.0E-04	3.0E-04	NA	1.2E-02	1.8E-04	NC	1.2E-02
Cadmium	2.7E+00	5.8E-07	8.9E-09	4.7E-11	1.0E-03	7.0E-05	NA	5.8E-04	1.3E-04	NC	7.1E-04
Chromium(III)	1.7E+01	3.6E-06	5.6E-08	2.9E-10	1.0E+00	4.0E-02	NA	3.6E-06	1.4E-06	NC	5.0E-06
Lead	2.4E+02	5.2E-05	7.9E-07	4.2E-09	NA	NA	NA	NC	NC	NC	NC
Mercury	2.8E-02	6.0E-09	9.2E-11	4.8E-13	3.0E-04	4.5E-05	8.6E-05	2.0E-05	2.0E-06	5.6E-09	2.2E-05
Nickel	1.5E+01	3.1E-06	4.7E-08	2.5E-10	2.0E-02	2.0E-03	NA	1.6E-04	2.4E-05	NC	1.8E-04
Thallium	1.2E+01	2.5E-06	3.9E-08	2.0E-10	8.0E-05	8.0E-05	NA	3.2E-02	4.8E-04	NC	3.2E-02
24D	5.0E+01	1.1E-05	4.9E-06	8.6E-10	1.0E-02	5.0E-03	NA	1.1E-03	9.8E-04	NC	2.0E-03
DDE	4.5E+00	9.7E-07	4.4E-07	7.8E-11	NA	NA	NA	NC	NC	NC	NC
DDT	2.7E+01	5.8E-06	2.7E-06	4.7E-10	5.0E-04	2.5E-04	NA	1.2E-02	1.1E-02	NC	2.2E-02
Endrin	8.6E-01	1.8E-07	8.5E-08	1.5E-11	3.0E-04	1.5E-04	NA	6.2E-04	5.6E-04	NC	1.2E-03
							Total Hazard Index:	6E-02	1E-02	6E-09	7E-02

NA Not applicable
NC Not calculated
CTE Central tendency exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 34 - PESTICIDE STORAGE AND HANDLING AREA

RME RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Dermal Slope Factor mg/kg-day)-	Inhalation Slope Factor (mg/kg-day)-1	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Chemical Cancer Risk
Arsenic	9.7E+00	3.2E-07	2.9E-09	1.4E-08	1.8E+00	1.8E+00	1.5E+01	5.8E-07	5.2E-09	2.0E-07	7.9E-07
Cadmium	1.4E+00	4.7E-08	4.2E-10	2.0E-09	NA	NA	6.3E+00	NC	NC	1.2E-08	1.2E-08
DDE	2.1E+00	7.1E-08	1.9E-08	2.9E-09	3.4E-01	3.8E-01	3.4E-01	2.4E-08	7.2E-09	1.0E-09	3.2E-08
DDT	1.3E+01	4.3E-07	1.2E-07	1.8E-08	3.4E-01	6.8E-01	3.4E-01	1.5E-07	7.8E-08	6.1E-09	2.3E-07
							Total Cancer Risk:	8E-07	9E-08	2E-07	1E-06

Chemical	Exposure Point Concentration (mg/kg)	Subchronic Oral Dose (mg/kg-day)	Subchronic Dermal Dose (mg/kg-day)	Subchronic Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Arsenic	9.7E+00	2.3E-05	2.0E-07	9.5E-07	3.0E-04	3.0E-04	NA	7.6E-02	6.8E-04	NC	7.6E-02
Cadmium	1.4E+00	3.3E-06	3.0E-08	1.4E-07	1.0E-03	7.0E-05	NA	3.3E-03	4.2E-04	NC	3.7E-03
Chromium(III)	2.3E+01	5.4E-05	4.8E-07	2.2E-06	1.0E+00	4.0E-02	NA	5.4E-05	1.2E-05	NC	6.6E-05
Lead	1.1E+02	2.7E-04	2.4E-06	1.1E-05	NA	NA	NA	NC	NC	NC	NC
Mercury	2.6E-02	6.1E-08	5.5E-10	2.5E-09	3.0E-04	4.5E-05	8.6E-05	2.0E-04	1.2E-05	3.0E-05	2.5E-04
Nickel	2.9E+01	6.8E-05	6.1E-07	2.8E-06	2.0E-02	2.0E-03	NA	3.4E-03	3.1E-04	NC	3.7E-03
Thallium	1.2E+01	2.9E-05	2.6E-07	1.2E-06	8.0E-04	8.0E-04	NA	3.6E-02	3.3E-04	NC	3.7E-02
24D	5.2E+01	1.2E-04	3.3E-05	5.1E-06	1.0E-02	5.0E-03	NA	1.2E-02	6.5E-03	NC	1.9E-02
DDE	2.1E+00	4.9E-06	1.3E-06	2.1E-07	NA	NA	NA	NC	NC	NC	NC
DDT	1.3E+01	3.0E-05	8.1E-06	1.3E-06	5.0E-04	2.5E-04	NA	6.0E-02	3.2E-02	NC	9.2E-02
Endrin	3.8E-01	9.0E-07	2.4E-07	3.8E-08	3.0E-04	1.5E-04	NA	3.0E-03	1.6E-03	NC	4.6E-03
							Total Hazard Index:	2E-01	4E-02	3E-05	2E-01

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 34 - PESTICIDE STORAGE AND HANDLING AREA

CTE RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Dermal Slope Factor mg/kg-day)-	Inhalation Slope Factor (mg/kg-day)-1	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Chemical Cancer Risk
Arsenic	9.7E+00	9.1E-08	5.1E-10	5.4E-09	1.8E+00	1.8E+00	1.5E+01	1.6E-07	9.2E-10	8.2E-08	2.5E-07
Cadmium	1.4E+00	1.3E-08	7.5E-11	7.9E-10	NA	NA	6.3E+00	NC	NC	5.0E-09	5.0E-09
DDE	2.1E+00	2.0E-08	3.4E-09	1.2E-09	3.4E-01	3.8E-01	3.4E-01	6.7E-09	1.3E-09	4.0E-10	8.4E-09
DDT	1.3E+01	1.2E-07	2.0E-08	7.1E-09	3.4E-01	6.8E-01	3.4E-01	4.1E-08	1.4E-08	2.4E-09	5.7E-08
							Total Cancer Risk:	2E-07	2E-08	9E-08	3E-07

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg-day)	Chronic Dermal Dose (mg/kg-day)	Chronic Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Arsenic	9.7E+00	6.4E-06	3.6E-08	3.8E-07	3.0E-04	3.0E-04	NA	2.1E-02	1.2E-04	NC	2.1E-02
Cadmium	1.4E+00	9.3E-07	5.2E-09	5.5E-08	1.0E-03	7.0E-05	NA	9.3E-04	7.5E-05	NC	1.0E-03
Chromium(III)	2.3E+01	1.5E-05	8.5E-08	9.0E-07	1.0E+00	4.0E-02	NA	1.5E-05	2.1E-06	NC	1.7E-05
Lead	1.1E+02	7.5E-05	4.2E-07	4.5E-06	NA	NA	NA	NC	NC	NC	NC
Mercury	2.6E-02	1.7E-08	9.7E-11	1.0E-09	3.0E-04	4.5E-05	8.6E-05	5.7E-05	2.1E-06	1.2E-05	7.1E-05
Nickel	2.9E+01	1.9E-05	1.1E-07	1.1E-06	2.0E-02	2.0E-03	NA	9.6E-04	5.4E-05	NC	1.0E-03
Thallium	1.2E+01	8.2E-06	4.6E-08	4.9E-07	8.0E-05	8.0E-05	NA	1.0E-01	5.8E-04	NC	1.0E-01
24D	5.2E+01	3.4E-05	5.8E-06	2.0E-06	1.0E-02	5.0E-03	NA	3.4E-03	1.2E-03	NC	4.6E-03
DDE	2.1E+00	1.4E-06	2.3E-07	8.2E-08	NA	NA	NA	NC	NC	NC	NC
DDT	1.3E+01	8.4E-06	1.4E-06	5.0E-07	5.0E-04	2.5E-04	NA	1.7E-02	5.7E-03	NC	2.3E-02
Endrin	3.8E-01	2.5E-07	4.3E-08	1.5E-08	3.0E-04	1.5E-04	NA	8.4E-04	2.9E-04	NC	1.1E-03
							Total Hazard Index:	1E-01	8E-03	1E-05	2E-01

NA Not applicable
NC Not calculated
CTE Central tendency exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 34 - PESTICIDE STORAGE AND HANDLING AREA

RME RISK CALCULATIONS FOR FUTURE TEAD-N RESIDENT

Chemical	Exposure Point Concentration (mg/kg)	Soil Lifetime Average Oral Dose (mg/kg-day)	Soil Lifetime Average Dermal Dose (mg/kg-day)	Soil Lifetime Average Inhalation Dose (mg/kg-day)	Produce Lifetime Average Oral Dose (mg/kg-day)	Beef Lifetime Average Oral Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Soil Ingestion Cancer Risk	Soil Dermal Cancer Risk	Soil Inhalation Cancer Risk	Produce Ingestion Cancer Risk	Beef Ingestion Cancer Risk	Total Cancer Risk
Arsenic	1.6E+01	2.5E-05	3.5E-07	8.0E-08	5.3E-05	4.6E-11	1.8E+00	1.8E+00	1.5E+01	4.6E-05	6.2E-07	1.2E-06	9.5E-05	8.3E-11	1.4E-04
Cadmium	2.7E+00	4.3E-06	5.8E-08	1.3E-08	1.3E-04	2.3E-12	NA	NA	6.3E+00	NC	NC	8.5E-08	NC	NC	8.5E-08
DDE	4.5E+00	7.1E-06	2.9E-06	2.2E-08	3.5E-05	2.3E-09	3.4E-01	3.8E-01	3.4E-01	2.4E-06	1.1E-06	7.6E-09	1.2E-05	7.8E-10	1.6E-05
DDT	2.7E+01	4.3E-05	1.7E-05	1.3E-07	6.3E-04	2.3E-09	3.4E-01	6.8E-01	3.4E-01	1.4E-05	1.2E-05	4.6E-08	2.1E-04	7.7E-10	2.4E-04
									Total Cancer Risk:	6E-05	1E-05	1E-06	3E-04	2E-09	4E-04

Chemical	Exposure Point Concentration (mg/kg)	Soil Chronic Oral Dose (mg/kg-day)	Soil Chronic Dermal Dose (mg/kg-day)	Soil Chronic Inhalation Dose (mg/kg-day)	Produce Chronic Oral Dose (mg/kg-day)	Beef Chronic Oral Dose (mg/kg-day)	Oral RfD	Dermal RfD	Inhalation RfD	Soil Ingestion Hazard Quotient	Soil Dermal Hazard Quotient	Soil Inhalation Hazard Quotient	Produce Ingestion Hazard Quotient	Beef Ingestion Hazard Quotient	Total Hazard Quotient
Arsenic	1.6E+01	2.1E-04	1.4E-06	4.8E-07	2.8E-04	2.9E-10	3.0E-04	3.0E-04	NA	6.9E-01	4.6E-03	NC	9.3E-01	9.7E-07	1.6E+00
Cadmium	2.7E+00	3.5E-05	2.3E-07	8.0E-08	7.1E-04	1.5E-11	1.0E-03	7.0E-05	NA	3.5E-02	3.3E-03	NC	7.1E-01	1.5E-08	7.5E-01
Chromium (III)	1.7E+01	2.2E-04	1.5E-06	5.0E-07	7.5E-05	4.1E-10	1.0E+00	4.0E-02	NA	2.2E-04	3.6E-05	NC	7.5E-05	4.1E-10	3.3E-04
Lead	2.4E+02	3.1E-03	2.1E-05	7.2E-06	4.9E-03	2.3E-10	NA	NA	NA	NC	NC	NC	NC	NC	NC
Mercury	2.8E-02	3.6E-07	2.4E-09	8.3E-10	1.2E-06	1.5E-13	3.0E-04	4.5E-05	8.6E-05	1.2E-03	5.3E-05	9.6E-06	3.8E-03	5.1E-10	5.1E-03
Nickel	1.5E+01	1.9E-04	1.2E-06	4.3E-07	2.9E-04	3.7E-10	2.0E-02	2.0E-03	NA	9.3E-03	6.2E-04	NC	1.4E-02	1.8E-08	2.4E-02
Thallium	1.2E+01	1.5E-04	1.0E-06	3.5E-07	1.9E-05	5.9E-09	8.0E-05	8.0E-05	NA	1.9E+00	1.3E-02	NC	2.4E-01	7.4E-05	2.1E+00
24D	5.0E+01	6.4E-04	1.3E-04	1.5E-06	NC	NC	1.0E-02	5.0E-03	NA	6.4E-02	2.6E-02	NC	NC	NC	8.9E-02
DDE	4.5E+00	5.8E-05	1.2E-05	1.3E-07	1.9E-04	1.5E-08	NA	NA	NA	NC	NC	NC	NC	NC	NC
DDT	2.7E+01	3.5E-04	7.0E-05	8.0E-07	3.3E-03	1.4E-08	5.0E-04	2.5E-04	NA	7.0E-01	2.8E-01	NC	6.6E+00	2.8E-05	7.6E+00
Endrin	8.6E-01	1.1E-05	2.2E-06	2.5E-08	NC	NC	3.0E-04	1.5E-04	NA	3.7E-02	1.5E-02	NC	NC	NC	5.1E-02
									Total Hazard Index:	3E+00	3E-01	1E-05	9E+00	1E-04	1E+01

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 34 DEPOT WORKER

INPUT		OUTPUT						
MEDIUM	LEVEL			percentiles				
				50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.1	BLOOD Pb, ADULT(µg/dL)		2.1	3.2	3.7	4.2	4.7
LEAD IN SOIL (ug/g)	242							
LEAD IN WATER (ug/l)	15							
PLANT UPTAKE? 1=YES 0=NO	0							
AIRBORNE DUST (ug/m^3)	50							

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	0.05	=	1E-04 (ug/dl)/(ug/day)	*	242	ug/g *	1.85	g soil/day (5 g/m^2 * 0.37 m^2)	2%
SOIL INGESTION:	0.11	=	0.018 (ug/dl)/(ug/day)	*	242	ug/g *	0.025	g soil/day	5%
INHALATION:	0.18	=	1.64 (ug/dl)/(ug/m^3)	*	0.11	ug/m^3			9%
WATER INGESTION:	0.84	=	0.04 (ug/dl)/(ug/day)	*	15	ug/l *	1.4	l water/day	41%
FOOD INGESTION:	0.88	=	0.04 (ug/dl)/(ug/day)	*	10.0	ug Pb/kg diet *	2.2	kg diet/day	43%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD	=	.945 * 10 + 0.055 * Pb in produce (ug/kg) =			10.0	ug/kg
LEAD IN PRODUCE	=	10 ug/kg or 0.00045 * soil lead	d	=	10.0	ug/kg

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 34 CONSTRUCTION WORKER

INPUT		OUTPUT					
MEDIUM	LEVEL			percentiles			
			50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.1						
LEAD IN SOIL (ug/g)	114	BLOOD Pb, ADULT(µg/dL)	2.0	3.2	3.6	4.1	4.6
LEAD IN WATER (ug/l)	15						
PLANT UPTAKE? 1=YES 0=NO	0						
AIRBORNE DUST (ug/m^3)	50						

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	0.02	=	1E-04 (ug/dl)/(ug/day)	*	114	ug/g *	1.85	g soil/day (5 g/m^2 * 0.37 m^2)	1%
SOIL INGESTION:	0.10	=	0.018 (ug/dl)/(ug/day)	*	114	ug/g *	0.05	g soil/day	5%
INHALATION:	0.17	=	1.64 (ug/dl)/(ug/m^3)	*	0.11	ug/m^3			9%
WATER INGESTION:	0.84	=	0.04 (ug/dl)/(ug/day)	*	15	ug/l *	1.4	l water/day	42%
FOOD INGESTION:	0.88	=	0.04 (ug/dl)/(ug/day)	*	10.0	ug Pb/kg diet *	2.2	kg diet/day	44%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD	=	.945 * 10 + 0.055 * Pb in produce (ug/kg) =			10.0	ug/kg
LEAD IN PRODUCE	=	10 ug/kg or 0.00045 * soil lead	d	=	10.0	ug/kg

OUTPUT FROM EPA IEUBK LEAD 0.5 MODEL FOR CHILDREN (SWMU 34)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
door AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	130.3	200.0
1-2	130.3	200.0
2-3	130.3	200.0
3-4	130.3	200.0
4-5	130.3	200.0
5-6	130.3	200.0
6-7	130.3	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

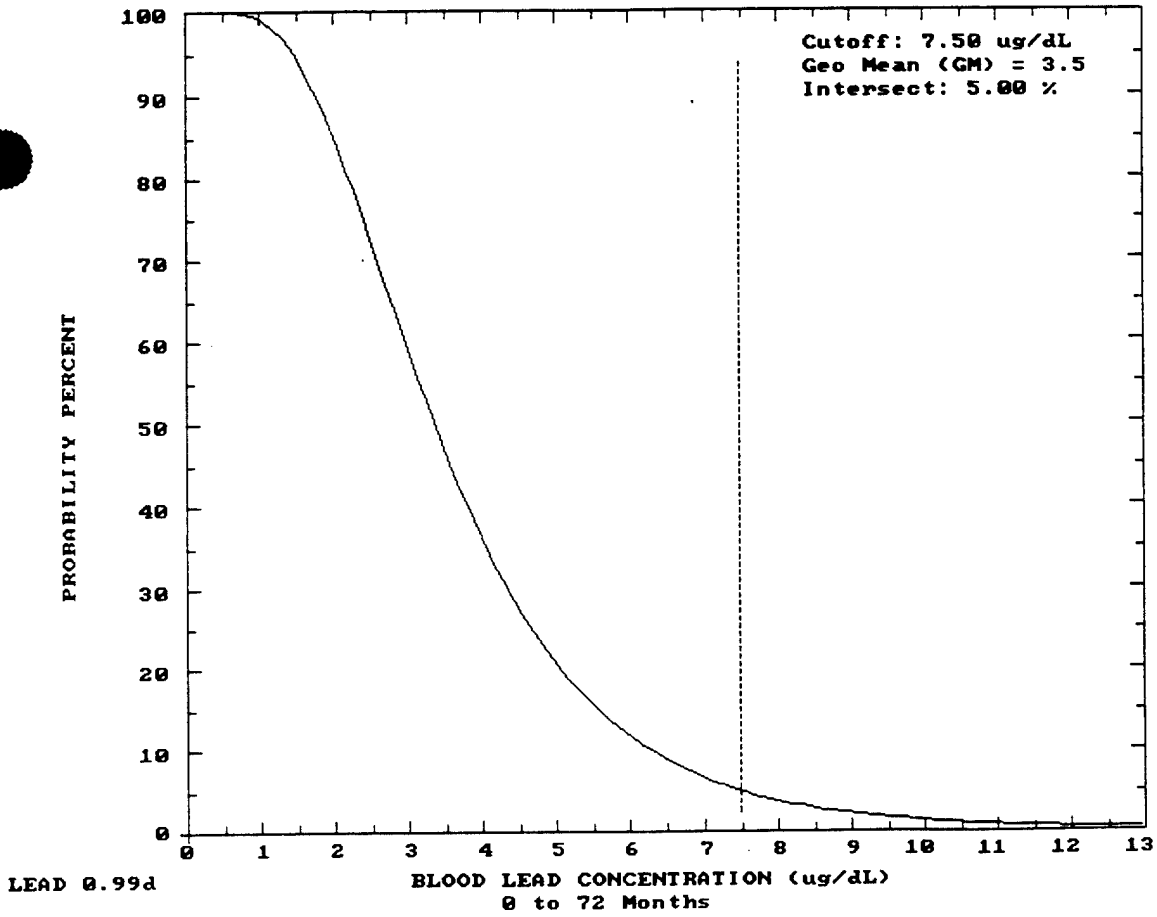
MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	3.8	6.92	3.97
1-2:	4.1	9.86	6.26
2-3:	3.8	10.35	6.32
3-4:	3.6	10.38	6.40
4-5:	3.1	8.80	4.82
5-6:	2.7	8.62	4.37
6-7:	2.5	8.73	4.14

R	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.56	0.37	0.00	0.02
1-2:	2.65	0.92	0.00	0.03
2-3:	3.00	0.96	0.00	0.06

3-4:	2.92	0.99	0.00	0.07
4-5:	2.86	1.05	0.00	0.07
5-6:	3.04	1.11	0.00	0.09
6-7:	3.37	1.14	0.00	0.09


Cutoff: 7.50 ug/dL
Geo Mean (GM) = 3.5
Intersect: 5.00 %
PROBABILITY PERCENT
100
90
80
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13
LEAD 0.99d
BLOOD LEAD CONCENTRATION (ug/dL)
0 to 72 Months

SWMU 37

TOXICITY INDICIES SCREEN FOR SECTION OF COPCs
SWMU 37 - CONTAMINATED WASTE PROCESSOR

Compound	Maximum Concentration mg/kg	Percent of Detects	Chronic Oral RfD	Non-carcinogenic Index	Percent of Total	Oral Slope Factor	Carcinogenic Index	Percent of Total	Comments
Cadmium	1.60E+00	17	1.00E-03	**1.60E+03**	49.6				
2,4,6-Trinitrotoluene	5.15E-01	8	5.00E-04	**1.03E+03**	31.9	3.00E-02	1.55E-02	0.03	
Pyrene	5.00E+00	44	3.00E-02	**1.67E+02**	5.2				
Fluoranthene	6.60E+00	39	4.00E-02	**1.65E+02**	5.1				
Phenanthrene	3.70E+00	41	3.00E-02	**1.23E+02**	3.8				
Selenium	4.63E-01	42	5.00E-03	**9.26E+01**	2.9				
Benzo[g,h,i]perylene	1.10E+00	5	3.00E-02	**3.67E+01**	1.1				
Di-n-butyl phthalate	1.00E+00	54	1.00E-01	1.00E+01	0.31				
Anthracene	7.00E-01	7	3.00E-01	2.33E+00	0.07				
Xylenes	2.00E-03	8	2.00E+00	1.00E-03	0.00003				
Dioxins/Furans (a)	6.13E-05	58				1.50E+05	**9.20E+00**	18.6	
Carcinogenic PAHs (b)	5.52E+00	45				7.30E+00	**4.03E+01**	81.4	
				Total noncarcinogenic index:	3.23E+03		Total carcinogenic index:	4.95E+01	
				Total noncarcinogenic index for COPCs:	3.21E+03		Total carcinogenic index for COPCs:	4.95E+01	

Contaminants of potential concern (COPCs) are in bold and underlined.

(a) Concentrations based on toxicity equivalence factors
(b) Concentrations based on potency equivalence factors

TEAD-N, SWMU 37 - CONTAMINATED WASTE PROCESSOR

RME RISK CALCULATIONS FOR FURNACE WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg/day)	Lifetime Average Dermal Dose (mg/kg/day)	Lifetime Average Inhalation Dose (mg/kg/day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Cadmium	9.8E-01	1.7E-07	7.4E-09	6.9E-12	NA	NA	6.3E+00	NC	NC	4.3E-11	4E-11
Dioxins/Furans	2.3E-05	4.1E-12	5.3E-12	1.6E-16	1.5E+05	1.7E+05	1.5E+05	6.1E-07	9.1E-07	2.5E-11	2E-06
Carcinogenic PAHs	1.8E+00	3.2E-07	4.1E-07	1.3E-11	7.3E+00	1.5E+01	NA	2.3E-06	6.0E-06	NC	8E-06
2,4,6-Trinitrotoluene	5.0E-01	8.8E-08	1.1E-07	3.5E-12	3.0E-02	3.8E-02	NA	2.6E-09	4.3E-09	NC	7E-09
							Total Cancer Risk:	2.9E-06	6.9E-06	6.8E-11	1E-05

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg/day)	Chronic Dermal Dose (mg/kg/day)	Chronic Inhalation Dose (mg/kg/day)	Oral RfD	Dermal RfD	Inhalation RfD	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Cadmium	9.8E-01	4.8E-07	2.1E-08	1.9E-11	1.0E-03	7.0E-05	NA	4.8E-04	2.9E-04	NC	8E-04
Selenium	3.7E-01	1.8E-07	7.8E-09	7.3E-12	5.0E-03	4.9E-03	NA	3.6E-05	1.6E-06	NC	4E-05
2,4,6-Trinitrotoluene	5.0E-01	2.5E-07	3.2E-07	9.9E-12	5.0E-04	4.0E-04	NA	4.9E-04	8.0E-04	NC	1E-03
Benzo[g,h,i]perylene	1.1E+00	5.4E-07	6.9E-07	2.2E-11	3.0E-02	1.5E-02	NA	1.8E-05	4.6E-05	NC	6E-05
Fluoranthene	1.7E+00	8.4E-07	1.1E-06	3.4E-11	4.0E-02	2.0E-02	NA	2.1E-05	5.4E-05	NC	8E-05
Pyrene	1.6E+00	7.9E-07	1.0E-06	3.1E-11	3.0E-02	1.5E-02	NA	2.6E-05	6.8E-05	NC	9E-05
Phenanthrene	9.5E-01	4.7E-07	6.0E-07	1.9E-11	3.0E-02	1.5E-02	NA	1.6E-05	4.0E-05	NC	6E-05
							Total Hazard Quotient:	1.1E-03	1.3E-03	NC	2E-03

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 37 - CONTAMINATED WASTE PROCESSOR

CTE RISK CALCULATIONS FOR FURNACE WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg/day)	Lifetime Average Dermal Dose (mg/kg/day)	Lifetime Average Inhalation Dose (mg/kg/day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Cadmium	9.8E-01	1.5E-08	2.3E-10	1.2E-12	NA	NA	6.3E+00	NC	NC	7.6E-12	8E-12
Dioxins/Furans	2.3E-05	3.6E-13	1.6E-13	2.9E-17	1.5E+05	1.7E+05	1.5E+05	5.4E-08	2.8E-08	4.3E-12	8E-08
Carcinogenic PAHs	1.8E+00	2.8E-08	1.3E-08	2.2E-12	7.3E+00	1.5E+01	NA	2.0E-07	1.9E-07	NC	4E-07
2,4,6-Trinitrotoluene	5.0E-01	7.7E-09	3.5E-09	6.2E-13	3.0E-02	3.8E-02	NA	2.3E-10	1.3E-10	NC	4E-10
							Total Cancer Risk:	2.6E-07	2.1E-07	1.2E-11	5E-07

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg/day)	Chronic Dermal Dose (mg/kg/day)	Chronic Inhalation Dose (mg/kg/day)	Oral RfD	Dermal RfD	Inhalation RfD	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Cadmium	9.8E-01	2.1E-07	3.2E-09	1.7E-11	1.0E-03	7.0E-05	NA	2.1E-04	4.6E-05	NC	3E-04
Selenium	3.7E-01	8.0E-08	1.2E-09	6.4E-12	5.0E-03	4.9E-03	NA	1.6E-05	2.5E-07	NC	2E-05
2,4,6-Trinitrotoluene	5.0E-01	1.1E-07	4.9E-08	8.7E-12	5.0E-04	4.0E-04	NA	2.2E-04	1.2E-04	NC	3E-04
Benzo[g,h,i]perylene	1.1E+00	2.4E-07	1.1E-07	1.9E-11	3.0E-02	1.5E-02	NA	7.9E-06	7.2E-06	NC	2E-05
Fluoranthene	1.7E+00	3.7E-07	1.7E-07	3.0E-11	4.0E-02	2.0E-02	NA	9.2E-06	8.4E-06	NC	2E-05
Pyrene	1.6E+00	3.4E-07	1.6E-07	2.8E-11	3.0E-02	1.5E-02	NA	1.1E-05	1.1E-05	NC	2E-05
Phenanthrene	9.5E-01	2.0E-07	9.4E-08	1.6E-11	3.0E-02	1.5E-02	NA	6.8E-06	6.2E-06	NC	1E-05
							Total Hazard Quotient:	4.8E-04	2.0E-04	NC	7E-04

NA	Not applicable
NC	Not calculated
CTE	Central tendency exposure
TEAD-N	Tooele Army Depot North Area

TEAD-N, SWMU 37 - CONTAMINATED WASTE PROCESSOR

RME RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg/day)	Lifetime Average Dermal Dose (mg/kg/day)	Lifetime Average Inhalation Dose (mg/kg/day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Cadmium	9.8E-01	3.3E-08	2.9E-10	1.4E-09	NA	NA	6.3E+00	NC	NC	8.6E-09	9E-09
Dioxins/Furans	1.6E-05	5.5E-13	1.5E-13	2.3E-14	1.5E+05	1.7E+05	1.5E+05	8.2E-08	2.5E-08	3.4E-09	1E-07
Carcinogenic PAHs	1.2E+00	4.0E-08	1.1E-08	1.6E-09	7.3E+00	1.5E+01	NA	2.9E-07	1.6E-07	NC	4E-07
2,4,6-Trinitrotoluene	5.0E-01	1.7E-08	4.5E-09	7.0E-10	3.0E-02	3.8E-02	NA	5.1E-10	1.7E-10	NC	7E-10
							Total Cancer Risk:	3.7E-07	1.8E-07	1.2E-08	6E-07

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg/day)	Chronic Dermal Dose (mg/kg/day)	Chronic Inhalation Dose (mg/kg/day)	Oral RfD	Dermal RfD	Inhalation RfD	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Cadmium	9.8E-01	2.3E-06	2.1E-08	9.6E-08	1.0E-03	7.0E-05	NA	2.3E-03	2.9E-04	NC	3E-03
Selenium	3.7E-01	8.7E-07	7.8E-09	3.6E-08	5.0E-03	4.9E-03	NA	1.7E-04	1.6E-06	NC	2E-04
2,4,6-Trinitrotoluene	5.0E-01	1.2E-06	3.2E-07	4.9E-08	5.0E-04	4.0E-04	NA	2.4E-03	8.0E-04	NC	3E-03
Benzo[g,h,i]perylene	9.8E-01	2.3E-06	6.2E-07	9.6E-08	3.0E-01	1.5E-01	NA	7.7E-06	4.1E-06	NC	1E-05
Fluoranthene	1.2E+00	2.8E-06	7.4E-07	1.2E-07	4.0E-01	2.0E-01	NA	6.9E-06	3.7E-06	NC	1E-05
Pyrene	1.1E+00	2.6E-06	6.9E-07	1.1E-07	3.0E-01	1.5E-01	NA	8.6E-06	4.6E-06	NC	1E-05
Phenanthrene	6.5E-01	1.5E-06	4.1E-07	6.4E-08	3.0E-01	1.5E-01	NA	5.1E-06	2.7E-06	NC	8E-06
							Total Hazard Quotient:	4.9E-03	1.1E-03	NC	6E-03

NA	Not applicable
NC	Not calculated
RME	Reasonable maximum exposure
TEAD-N	Tooele Army Depot North Area

TEAD-N, SWMU 37 - CONTAMINATED WASTE PROCESSING PLANT

RME RISK CALCULATIONS FOR FUTURE TEAD-N RESIDENT

Chemical	Exposure Point Concentration (mg/kg)	Soil Lifetime Average Oral Dose (mg/kg-day)	Soil Lifetime Average Dermal Dose (mg/kg-day)	Soil Lifetime Average Inhalation Dose (mg/kg-day)	Produce Lifetime Average Oral Dose (mg/kg-day)	Beef Lifetime Average Oral Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Soil Ingestion Cancer Risk	Soil Dermal Cancer Risk	Soil Inhalation Cancer Risk	Produce Ingestion Cancer Risk	Beef Ingestion Cancer Risk	Total Cancer Risk
Cadmium	6.9E-01	1.1E-06	1.5E-08	3.4E-09	3.4E-05	5.3E-11	NA	NA	6.3E+00	NC	NC	2.2E-08	NC	NC	2.2E-08
Dioxins/Furans	2.3E-05	3.7E-11	1.5E-11	1.2E-13	2.7E-10	5.7E-13	1.5E+05	1.7E+05	1.5E+05	5.5E-06	2.6E-06	1.7E-08	4.0E-05	8.6E-08	4.8E-05
Carcinogenic PAHs	1.8E+00	2.8E-06	1.2E-06	9.0E-09	5.0E-05	1.0E-08	7.3E+00	1.5E+01	NA	2.1E-05	1.7E-05	NC	3.6E-04	7.4E-08	4.0E-04
2,4,6-Trinitrotoluene	5.0E-01	7.9E-07	3.2E-07	2.5E-09	5.3E-03	3.4E-12	3.0E-02	3.8E-02	NA	2.4E-08	1.2E-08	NC	1.6E-04	1.0E-13	1.6E-04
									Total Cancer Risk:	3E-05	2E-05	4E-08	6E-04	2E-07	6E-04

Chemical	Exposure Point Concentration (mg/kg)	Soil Chronic Oral Dose (mg/kg-day)	Soil Chronic Dermal Dose (mg/kg-day)	Soil Chronic Inhalation Dose (mg/kg-day)	Produce Chronic Oral Dose (mg/kg-day)	Beef Chronic Oral Dose (mg/kg-day)	Oral RfD	Dermal RfD	Inhalation RfD	Soil Ingestion Hazard Quotient	Soil Dermal Hazard Quotient	Soil Inhalation Hazard Quotient	Produce Ingestion Hazard Quotient	Beef Ingestion Hazard Quotient	Total Hazard Quotient
Cadmium	6.9E-01	8.8E-06	5.9E-08	2.0E-08	1.8E-04	3.4E-10	1.0E-03	7.0E-05	NA	8.8E-03	8.4E-04	NC	1.8E-01	3.4E-07	1.9E-01
Selenium	3.0E-01	3.8E-06	2.6E-08	8.9E-09	NC	NC	5.0E-03	4.9E-03	NA	7.7E-04	5.3E-06	NC	NC	NC	7.7E-04
2,4,6-Trinitrotoluene	5.0E-01	6.4E-06	1.3E-06	1.5E-08	2.8E-02	2.1E-11	5.0E-04	4.0E-04	NA	1.3E-02	3.2E-03	NC	5.7E+01	4.3E-08	5.7E+01
Benzo(g,h,i)perylene	3.4E-01	4.3E-06	8.7E-07	1.0E-08	4.4E-05	1.5E-08	3.0E-02	1.5E-02	NA	1.4E-04	5.8E-05	NC	1.5E-03	4.9E-07	1.7E-03
Fluoranthene	1.7E+00	2.1E-05	4.3E-06	4.9E-08	1.1E-03	5.4E-09	4.0E-02	2.0E-02	NA	5.3E-04	2.1E-04	NC	2.8E-02	1.3E-07	2.9E-02
Pyrene	1.6E+00	2.0E-05	4.1E-06	4.7E-08	1.1E-03	5.0E-09	3.0E-02	1.5E-02	NA	6.8E-04	2.7E-04	NC	3.7E-02	1.7E-07	3.8E-02
Phenanthrene	9.2E-01	1.2E-05	2.4E-06	2.7E-08	9.8E-04	1.6E-09	3.0E-02	1.5E-02	NA	3.9E-04	1.6E-04	NC	3.3E-02	5.4E-08	3.3E-02
									Total Hazard Index:	2E-02	5E-03	NC	6E+01	1E-06	6E+01

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

SWMU 42

TOXICITY INDICIES SCREEN FOR SELECTION OF COPCs
SWMU 42 - BOMB WASHOUT BUILDING

Compound	Maximum Concentration mg/kg	Number of Analyses	Number of Detects	Percent of Detects	Chronic Oral RfD	Non-carcinogenic Index	Percent of Total	Oral Slope Factor	Carcinogenic Index	Percent of Total	Comments
Antimony	5.30E+03	139	23	17	4.00E-04	**1.33E+07**	78.0				
Thallium	2.00E+02	139	94	68	8.00E-05	**2.50E+06**	14.7				
Barium	4.40E+04	139	139	100	7.00E-02	**6.29E+05**	3.7				
Arsenic	7.70E+01	139	139	100	3.00E-04	**2.57E+05**	1.5	1.80E+00	**1.39E+02**	29.6	
Chromium	8.52E+02	139	139	100	5.00E-03	**1.70E+05**	1.0				
Cadmium	8.94E+01	139	58	42	1.00E-03	**8.94E+04**	0.5				
Zinc	9.90E+03	139	138	99	3.00E-01	3.30E+04	0.2				
2,4-Dinitrotoluene	5.30E+01	74	7	9	2.00E-03	2.65E+04	0.2	6.80E-01	**2.99E+02**	63.9	
Nickel	4.20E+02	139	139	100	2.00E-02	2.10E+04	0.1				
Manganese	9.20E+02	139	139	100	1.40E-01	**6.57E+03**	0.04				More toxic by inhalation
2,6-Dinitrotoluene	3.48E+00	74	3	4	1.00E-03	3.48E+03	0.02	6.80E-01	**1.54E+01**	3.3	
Vanadium	1.94E+01	139	137	99	7.00E-03	2.77E+03	0.02				
Mercury	6.74E-01	139	19	14	3.00E-04	**2.25E+03**	0.01				More toxic by inhalation
Beryllium	3.00E+00	139	44	32	5.00E-03	6.00E+02	0.004	4.30E+00	**1.29E+01**	2.8	More carcinogenic by inhalation
Cyanide	3.21E+00	34	5	15	2.00E-02	1.61E+02	0.001				
Silver	5.89E-01	139	24	17	5.00E-03	1.18E+02	0.001				
Cobalt	3.45E+01	139	119	86							
Copper	2.30E+04	139	139	100							
Lead	1.00E+05	139	104	75							
Dioxins/Furans	1.50E-05	3	3	100				1.50E+05	**2.25E+00**	0.5	
					Total noncarcinogenic index:	1.70E+07			Total carcinogenic index:	4.68E+02	
					Total noncarcinogenic index for COPCs:	1.69E+07			Total carcinogenic index for COPCs:	4.68E+02	

Contaminants of potential concern (COPCs) are in bold and underlined.

TEAD-N, SWMU 42 - BOMB WASHOUT BUILDING

RME RISK CALCULATIONS FOR MAINTENANCE PERSONNEL

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg/day)	Lifetime Average Dermal Dose (mg/kg/day)	Lifetime Average Inhalation Dose (mg/kg/day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Arsenic	2.1E+01	4.5E-07	1.9E-08	4.5E-09	1.8E+00	1.8E+00	1.5E+01	8.1E-07	3.5E-08	6.7E-08	9.1E-07
Beryllium	5.7E-01	1.2E-08	5.1E-10	1.2E-10	4.3E+00	8.6E+01	8.4E+00	5.1E-08	4.4E-08	1.0E-09	9.6E-08
Cadmium	1.2E+01	2.5E-07	1.1E-08	2.5E-09	NA	NA	6.3E+00	NC	NC	1.6E-08	1.6E-08
Chromium(VI)	2.8E+01	5.9E-07	2.5E-08	5.9E-09	NA	NA	4.1E+01	NC	NC	2.4E-07	2.4E-07
2,4-Dinitrotoluene	5.6E+00	1.2E-07	1.5E-07	1.2E-09	6.8E-01	9.1E-01	NA	8.0E-08	1.4E-07	NC	2.2E-07
2,6-Dinitrotoluene	5.9E-01	1.2E-08	1.6E-08	1.2E-10	6.8E-01	9.1E-01	NA	8.4E-09	1.4E-07	NC	1.5E-07
Dioxins/Furans	1.5E-05	3.1E-13	4.0E-13	3.1E-15	1.5E+05	1.7E+05	1.5E+05	4.6E-08	6.9E-08	4.6E-10	1.2E-07
							Total Cancer Risk:	9.9E-07	4.2E-07	3.3E-07	2E-06

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg/day)	Chronic Dermal Dose (mg/kg/day)	Chronic Inhalation Dose (mg/kg/day)	Subchronic Oral RfD	Subchronic Dermal RfD	Subchronic Inhalation RfD	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Antimony	3.9E+02	1.9E-04	8.3E-06	1.9E-06	4.0E-04	4.0E-06	NA	4.8E-01	2.1E+00	NC	3E+00
Arsenic	2.1E+01	1.0E-05	4.5E-07	1.0E-07	3.0E-04	3.0E-04	NA	3.5E-02	1.5E-03	NC	4E-02
Barium	4.7E+03	2.3E-03	9.9E-05	2.3E-05	7.0E-02	3.5E-03	1.0E-03	3.3E-02	2.8E-02	2.3E-02	8E-02
Beryllium	5.7E-01	2.8E-07	1.2E-08	2.8E-09	5.0E-03	2.5E-04	NA	5.5E-05	4.8E-05	NC	1E-04
Cadmium	1.2E+01	5.8E-06	2.5E-07	5.8E-08	1.0E-03	7.0E-05	NA	5.8E-03	3.6E-03	NC	9E-03
Chromium(VI)	2.8E+01	1.4E-05	5.9E-07	1.4E-07	2.0E-02	2.2E-03	NA	6.8E-04	2.7E-04	NC	1E-03
Chromium(III)	1.1E+02	5.3E-05	2.3E-06	5.3E-07	1.0E+00	4.0E-02	NA	5.3E-05	5.7E-05	NC	1E-04
Lead	1.2E+04	5.8E-03	2.5E-04	5.8E-05	NA	NA	NA	NC	NC	NC	NC
Manganese	3.0E+02	1.5E-04	6.3E-06	1.5E-06	1.4E-01	4.2E-03	1.4E-05	1.0E-03	1.5E-03	1.0E-01	1E-01
Mercury	7.3E-02	3.6E-08	1.5E-09	3.6E-10	3.0E-04	4.5E-05	8.6E-05	1.2E-04	3.4E-05	4.2E-06	2E-04
Thallium	2.5E+01	1.2E-05	5.2E-07	1.2E-07	8.0E-04	8.0E-04	NA	1.5E-02	6.6E-04	NC	2E-02
2,4-Dinitrotoluene	5.6E+00	2.7E-06	3.5E-06	2.7E-08	2.0E-03	1.5E-03	NA	1.4E-03	2.4E-03	NC	4E-03
2,6-Dinitrotoluene	5.9E-01	2.9E-07	3.7E-07	2.9E-09	1.0E-03	7.5E-04	NA	2.9E-04	5.0E-04	NC	8E-04
							Total Hazard Quotient:	5.7E-01	2.1E+00	1.3E-01	3E+00

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot-North Area

TEAD-N, SWMU 42 - BOMB WASHOUT BUILDING

CTE RISK CALCULATIONS FOR MAINTENANCE PERSONNEL

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg/day)	Lifetime Average Dermal Dose (mg/kg/day)	Lifetime Average Inhalation Dose (mg/kg/day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Arsenic	2.1E+01	2.0E-07	3.0E-09	1.6E-11	1.8E+00	1.8E+00	1.5E+01	3.5E-07	5.4E-09	2.4E-10	3.6E-07
Beryllium	5.7E-01	5.2E-09	7.9E-11	4.2E-13	4.3E+00	8.6E+01	8.4E+00	2.2E-08	6.8E-09	3.5E-12	2.9E-08
Cadmium	1.2E+01	1.1E-07	1.7E-09	8.7E-12	NA	NA	6.3E+00	NC	NC	5.5E-11	5.5E-11
Chromium(VI)	2.8E+01	2.6E-07	3.9E-09	2.1E-11	NA	NA	4.1E+01	NC	NC	8.5E-10	8.5E-10
2,4-Dinitrotoluene	5.6E+00	5.2E-08	2.4E-08	4.1E-12	6.8E-01	9.1E-01	NA	3.5E-08	2.1E-08	NC	5.6E-08
2,6-Dinitrotoluene	5.9E-01	5.4E-09	2.5E-09	4.4E-13	6.8E-01	9.1E-01	NA	3.7E-09	2.1E-08	NC	2.5E-08
Dioxins/Furans	1.5E-05	1.4E-13	6.2E-14	1.1E-17	1.5E+05	1.7E+05	1.5E+05	2.0E-08	1.1E-08	1.6E-12	3.1E-08
							Total Cancer Risk:	4.4E-07	6.6E-08	1.1E-09	5E-07

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg/day)	Chronic Dermal Dose (mg/kg/day)	Chronic Inhalation Dose (mg/kg/day)	Subchronic Oral RfD	Subchronic Dermal RfD	Subchronic Inhalation RfD	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Antimony	3.9E+02	8.4E-05	1.3E-06	6.8E-09	4.0E-04	4.0E-06	NA	2.1E-01	3.2E-01	NC	5E-01
Arsenic	2.1E+01	4.6E-06	7.0E-08	3.7E-10	3.0E-04	3.0E-04	NA	1.5E-02	2.3E-04	NC	2E-02
Barium	4.7E+03	1.0E-03	1.5E-05	8.1E-08	7.0E-02	3.5E-03	1.0E-03	1.4E-02	4.4E-03	8.1E-05	2E-02
Beryllium	5.7E-01	1.2E-07	1.9E-09	9.8E-12	5.0E-03	2.5E-04	NA	2.4E-05	7.4E-06	NC	3E-05
Cadmium	1.2E+01	2.5E-06	3.9E-08	2.0E-10	1.0E-03	7.0E-05	NA	2.5E-03	5.5E-04	NC	3E-03
Chromium(VI)	2.8E+01	6.0E-06	9.2E-08	4.8E-10	2.0E-02	2.2E-03	NA	3.0E-04	4.2E-05	NC	3E-04
Chromium(III)	1.1E+02	2.3E-05	3.5E-07	1.9E-09	1.0E+00	4.0E-02	NA	2.3E-05	8.8E-06	NC	3E-05
Lead	1.2E+04	2.5E-03	3.9E-05	2.0E-07	NA	NA	NA	NC	NC	NC	NC
Manganese	3.0E+02	6.4E-05	9.8E-07	5.2E-09	1.4E-01	4.2E-03	1.4E-05	4.6E-04	2.3E-04	3.6E-04	1E-03
Mercury	7.3E-02	1.6E-08	2.4E-10	1.3E-12	3.0E-04	4.5E-05	8.6E-05	5.2E-05	5.3E-06	1.5E-08	6E-05
Thallium	2.5E+01	5.3E-06	8.2E-08	4.3E-10	8.0E-04	8.0E-04	NA	6.7E-03	1.0E-04	NC	7E-03
2,4-Dinitrotoluene	5.6E+00	1.2E-06	5.5E-07	9.7E-11	2.0E-03	1.5E-03	NA	6.0E-04	3.7E-04	NC	1E-03
2,6-Dinitrotoluene	5.9E-01	1.3E-07	5.8E-08	1.0E-11	1.0E-03	7.5E-04	NA	1.3E-04	7.7E-05	NC	2E-04
							Total Hazard Quotient:	2.5E-01	3.3E-01	4.4E-04	6E-01

NA Not applicable
NC Not calculated
CTE Central Tendency exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 42 - BOMB WASHOUT BUILDING

RISK CALCULATIONS FOR CURRENT RESIDENTS

Chemical	RME Concentration (mg/kg)	Lifetime Average Inhalation Dose (mg/kg/day)			Inhalation Slope Factor	Inhalation Cancer Risk		
		Grantsville	Stockton	Depot Housing		Grantsville	Stockton	Depot Housing
Arsenic	2.1E+01	2.0E-10	1.7E-10	1.1E-08	1.5E+01	3.1E-09	2.6E-09	1.7E-07
Beryllium	5.7E-01	5.4E-12	4.6E-12	3.0E-10	8.4E+00	4.5E-11	3.9E-11	2.5E-09
Cadmium	1.2E+01	1.1E-10	9.7E-11	6.3E-09	6.3E+00	7.1E-10	6.1E-10	4.0E-08
Chromium (VI)	2.8E+01	2.7E-10	2.3E-10	1.5E-08	4.1E+01	1.1E-08	9.4E-09	6.1E-07
2,4-Dinitrotoluene	5.6E+00	5.3E-11	4.6E-11	3.0E-09	NA	NC	NC	NC
2,6-Dinitrotoluene	5.9E-01	5.6E-12	4.8E-12	3.1E-10	NA	NC	NC	NC
Dioxins/Furans	1.5E-05	1.4E-16	1.2E-16	7.8E-15	1.5E+05	2.1E-11	1.8E-11	1.2E-09
					Total Cancer Risk:	1E-08	1E-08	8E-07

Chemical	RME Concentration (mg/kg)	Chronic Daily Inhalation Dose (mg/kg/day)			Inhalation RfD	Inhalation Hazard Quotient		
		Grantsville	Stockton	Depot Housing		Grantsville	Stockton	Depot Housing
Antimony	3.9E+02	2.2E-08	1.9E-08	2.9E-06	NA	NC	NC	NC
Arsenic	2.1E+01	1.2E-09	1.0E-09	1.6E-07	NA	NC	NC	NC
Barium	4.7E+03	2.7E-07	2.3E-07	3.5E-05	1.0E-04	2.7E-03	2.3E-03	3.0E-01
Beryllium	5.7E-01	3.2E-11	2.8E-11	4.2E-09	NA	NC	NC	NC
Cadmium	1.2E+01	6.7E-10	5.8E-10	8.8E-08	NA	NC	NC	NC
Chromium (VI)	2.8E+01	1.6E-09	1.4E-09	2.1E-07	NA	NC	NC	NC
Chromium (III)	1.1E+02	6.1E-09	5.3E-09	8.0E-07	NA	NC	NC	NC
Lead	1.2E+04	6.7E-07	5.7E-07	8.8E-05	NA	NC	NC	NC
Manganese	3.0E+02	1.7E-08	1.5E-08	2.2E-06	1.4E-05	1.2E-03	1.0E-03	1.3E-01
Mercury	7.3E-02	4.1E-12	3.6E-12	5.4E-10	8.6E-05	4.8E-08	4.1E-08	5.4E-06
Thallium	2.5E+01	1.4E-09	1.2E-09	1.9E-07	NA	NC	NC	NC
2,4-Dinitrotoluene	5.6E+00	3.2E-10	2.7E-10	4.2E-08	NA	NC	NC	NC
2,6-Dinitrotoluene	5.9E-01	3.3E-11	2.9E-11	4.4E-09	NA	NC	NC	NC
					Total Hazard Index:	4E-03	3E-03	4E-01

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 42 - BOMB WASHOUT BUILDING

RME RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg/day)	Lifetime Average Dermal Dose (mg/kg/day)	Lifetime Average Inhalation Dose (mg/kg/day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Arsenic	1.3E+01	4.3E-07	3.9E-09	1.8E-08	1.8E+00	1.8E+00	1.5E+01	7.8E-07	7.0E-09	2.7E-07	1E-06
Beryllium	4.0E-01	1.4E-08	1.2E-10	5.6E-10	4.3E+00	8.6E+01	8.4E+00	5.8E-08	1.0E-08	4.7E-09	7E-08
Cadmium	6.6E+00	2.2E-07	2.0E-09	9.2E-09	NA	NA	6.3E+00	NC	NC	5.8E-08	6E-08
Chromium(VI)	2.8E+01	9.4E-07	8.4E-09	3.9E-08	NA	NA	4.1E+01	NC	NC	1.6E-06	2E-06
2,4-Dinitrotoluene	3.5E+00	1.2E-07	3.1E-08	4.9E-09	6.8E-01	9.1E-01	NA	8.0E-08	2.9E-08	NC	1E-07
2,6-Dinitrotoluene	4.6E-01	1.5E-08	4.1E-09	6.4E-10	6.8E-01	9.1E-01	NA	1.0E-08	2.9E-08	NC	4E-08
Dioxins/Furans	1.5E-05	4.9E-13	1.3E-13	2.1E-14	1.5E+05	1.7E+05	1.5E+05	7.4E-08	2.3E-08	3.1E-09	1E-07
							Total Cancer Risk:	1E-06	1E-07	2E-06	3E-06

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg/day)	Chronic Dermal Dose (mg/kg/day)	Chronic Inhalation Dose (mg/kg/day)	Oral RfD	Dermal RfD	Inhalation RfD	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Antimony	1.9E+02	4.6E-04	4.1E-06	1.9E-05	4.0E-04	4.0E-06	NA	1.1E+00	1.0E+00	NC	2E+00
Arsenic	1.3E+01	3.0E-05	2.7E-07	1.3E-06	3.0E-04	3.0E-04	NA	1.0E-01	9.1E-04	NC	1E-01
Barium	3.0E+03	7.0E-03	6.3E-05	2.9E-04	7.0E-02	3.5E-03	5.0E-03	1.0E-01	1.8E-02	5.8E-02	2E-01
Beryllium	4.0E-01	9.5E-07	8.5E-09	4.0E-08	5.0E-03	2.5E-04	NA	1.9E-04	3.4E-05	NC	2E-04
Cadmium	6.6E+00	1.5E-05	1.4E-07	6.4E-07	1.0E-03	7.0E-05	NA	1.5E-02	2.0E-03	NC	2E-02
Chromium(VI)	2.8E+01	6.6E-05	5.9E-07	2.7E-06	2.0E-02	2.2E-03	NA	3.3E-03	2.7E-04	NC	4E-03
Chromium(III)	1.1E+02	2.5E-04	2.3E-06	1.1E-05	1.0E+00	4.0E-02	NA	2.5E-04	5.7E-05	NC	3E-04
Lead	6.3E+03	1.5E-02	1.3E-04	6.1E-04	NA	NA	NA	NC	NC	NC	NC
Manganese	2.0E+02	4.7E-04	4.2E-06	1.9E-05	1.4E-01	4.2E-03	1.4E-05	3.3E-03	1.0E-03	1.4E+00	1E+00
Mercury	4.8E-02	1.1E-07	1.0E-09	4.7E-09	3.0E-04	4.5E-05	8.6E-05	3.8E-04	2.2E-05	5.5E-05	5E-04
Thallium	1.8E+01	4.2E-05	3.8E-07	1.8E-06	8.0E-04	8.0E-04	NA	5.3E-02	4.7E-04	NC	5E-02
2,4-Dinitrotoluene	3.5E+00	8.2E-06	2.2E-06	3.4E-07	2.0E-03	1.5E-03	NA	4.1E-03	1.5E-03	NC	6E-03
2,6-Dinitrotoluene	4.6E-01	1.1E-06	2.9E-07	4.5E-08	1.0E-02	7.5E-03	NA	1.1E-04	3.9E-05	NC	1E-04
							Total Hazard Quotient:	1E+00	1E+00	1E+00	4E+00

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 42 - BOMB WASHOUT BUILDING

CTE RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg/day)	Lifetime Average Dermal Dose (mg/kg/day)	Lifetime Average Inhalation Dose (mg/kg/day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Arsenic	1.3E+01	1.2E-07	6.9E-10	7.2E-09	1.8E+00	1.8E+00	1.5E+01	2.2E-07	1.2E-09	1.1E-07	3E-07
Beryllium	4.0E-01	3.8E-09	2.1E-11	2.3E-10	4.3E+00	8.6E+01	8.4E+00	1.6E-08	1.8E-09	1.9E-09	2E-08
Cadmium	6.6E+00	6.2E-08	3.5E-10	3.7E-09	NA	NA	6.3E+00	NC	NC	2.3E-08	2E-08
Chromium(VI)	2.8E+01	2.6E-07	1.5E-09	1.6E-08	NA	NA	4.1E+01	NC	NC	6.4E-07	6E-07
2,4-Dinitrotoluene	3.5E+00	3.3E-08	5.6E-09	2.0E-09	6.8E-01	9.1E-01	NA	2.2E-08	5.0E-09	NC	3E-08
2,6-Dinitrotoluene	4.6E-01	4.3E-09	7.3E-10	2.6E-10	6.8E-01	9.1E-01	NA	2.9E-09	5.0E-09	NC	8E-09
Dioxins/Furans	1.5E-05	1.4E-13	2.3E-14	8.2E-15	1.5E+05	1.7E+05	1.5E+05	2.1E-08	4.0E-09	1.2E-09	3E-08
							Total Cancer Risk:	3E-07	2E-08	8E-07	1E-06

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg/day)	Chronic Dermal Dose (mg/kg/day)	Chronic Inhalation Dose (mg/kg/day)	Oral RfD	Dermal RfD	Inhalation RfD	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Antimony	1.9E+02	1.3E-04	7.2E-07	7.6E-06	4.0E-04	4.0E-06	NA	3.2E-01	1.8E-01	NC	5E-01
Arsenic	1.3E+01	8.6E-06	4.8E-08	5.1E-07	3.0E-04	3.0E-04	NA	2.9E-02	1.6E-04	NC	3E-02
Barium	3.0E+03	2.0E-03	1.1E-05	1.2E-04	7.0E-02	3.5E-03	5.0E-03	2.8E-02	3.2E-03	2.3E-02	5E-02
Beryllium	4.0E-01	2.7E-07	1.5E-09	1.6E-08	5.0E-03	2.5E-04	NA	5.3E-05	6.0E-06	NC	6E-05
Cadmium	6.6E+00	4.3E-06	2.4E-08	2.6E-07	1.0E-03	7.0E-05	NA	4.3E-03	3.5E-04	NC	5E-03
Chromium(VI)	2.8E+01	1.8E-05	1.0E-07	1.1E-06	2.0E-02	2.2E-03	NA	9.2E-04	4.7E-05	NC	1E-03
Chromium(III)	1.1E+02	7.1E-05	4.0E-07	4.2E-06	1.0E+00	4.0E-02	NA	7.1E-05	1.0E-05	NC	8E-05
Lead	6.3E+03	4.1E-03	2.3E-05	2.4E-04	NA	NA	NA	NC	NC	NC	NC
Manganese	2.0E+02	1.3E-04	7.4E-07	7.8E-06	1.4E-01	4.2E-03	1.4E-05	9.4E-04	1.8E-04	5.4E-01	5E-01
Mercury	4.8E-02	3.2E-08	1.8E-10	1.9E-09	3.0E-04	4.5E-05	8.6E-05	1.1E-04	4.0E-06	2.2E-05	1E-04
Thallium	1.8E+01	1.2E-05	6.7E-08	7.0E-07	8.0E-04	8.0E-04	NA	1.5E-02	8.3E-05	NC	1E-02
2,4-Dinitrotoluene	3.5E+00	2.3E-06	3.9E-07	1.4E-07	2.0E-03	1.5E-03	NA	1.2E-03	2.6E-04	NC	1E-03
2,6-Dinitrotoluene	4.6E-01	3.0E-07	5.1E-08	1.8E-08	1.0E-02	7.5E-03	NA	3.0E-05	6.8E-06	NC	4E-05
							Total Hazard Quotient:	4E-01	2E-01	6E-01	1E+00

NA Not applicable
NC Not calculated
CTE Central tendency exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 42 - BOMB WASHOUT BUILDING

RME RISK CALCULATIONS FOR FUTURE TEAD-N RESIDENT

Chemical	Exposure Point Concentration (mg/kg)	Soil			Produce	Beef				Soil			Produce	Beef	
		Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Oral Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Ingestion Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Ingestion Cancer Risk	Ingestion Cancer Risk	Total Cancer Risk
Arsenic	2.1E+01	3.4E-05	4.6E-07	1.1E-07	7.0E-05	1.2E-08	1.8E+00	1.8E+00	1.5E+01	6.0E-05	8.2E-07	1.6E-06	1.3E-04	2.1E-08	1.9E-04
Beryllium	5.7E-01	8.9E-07	1.2E-08	2.8E-09	4.6E-07	2.2E-10	4.3E+00	8.6E+01	8.4E+00	3.8E-06	1.0E-06	2.4E-08	2.0E-06	9.6E-10	6.9E-06
Cadmium	1.2E+01	1.9E-05	2.5E-07	5.9E-08	5.8E-04	2.0E-09	NA	NA	6.3E+00	NC	NC	3.7E-07	NC	NC	3.7E-07
2,4-Dinitrotoluene	5.6E+00	8.8E-06	3.6E-06	2.8E-08	3.6E-02	1.2E-10	6.8E-01	9.1E-01	NA	6.0E-06	3.3E-06	NC	2.4E-02	8.1E-11	2.4E-02
Dioxins/Furans	1.5E-05	2.3E-11	9.4E-12	7.3E-14	1.7E-10	7.8E-13	1.5E+05	1.7E+05	1.5E+05	3.5E-06	1.6E-06	1.1E-08	2.5E-05	1.2E-07	3.0E-05
									Total Cancer Risk:	7E-05	7E-06	8E-06	3E-02	1E-07	3E-02

Chemical	Exposure Point Concentration (mg/kg)	Soil			Produce	Beef				Soil			Produce	Beef	
		Chronic Oral Dose (mg/kg-day)	Chronic Dermal Dose (mg/kg-day)	Chronic Inhalation Dose (mg/kg-day)	Chronic Oral Dose (mg/kg-day)	Chronic Oral Dose (mg/kg-day)	Oral RfD	Dermal RfD	Inhalation RfD	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Ingestion Hazard Quotient	Ingestion Hazard Quotient	Total Hazard Quotient
Antimony	3.9E+02	5.0E-03	3.4E-05	1.2E-05	3.4E-02	1.5E-06	4.0E-04	4.0E-06	NA	1.3E+01	8.4E+00	NC	8.5E+01	3.7E-03	1.1E+02
Arsenic	2.1E+01	2.7E-04	1.8E-06	6.3E-07	3.7E-04	7.5E-08	3.0E-04	3.0E-04	NA	9.1E-01	6.1E-03	NC	1.2E+00	2.5E-04	2.2E+00
Barium	4.7E+03	6.0E-02	4.0E-04	1.4E-04	2.9E-01	2.4E-06	7.0E-02	3.5E-03	1.0E-04	8.6E-01	1.1E-01	1.4E+00	4.2E+00	3.5E-05	6.5E+00
Beryllium	5.7E-01	7.2E-06	4.8E-08	1.7E-08	2.4E-06	1.4E-09	5.0E-03	2.5E-04	NA	1.4E-03	1.9E-04	NC	4.9E-04	2.8E-07	2.1E-03
Cadmium	1.2E+01	1.5E-04	1.0E-06	3.5E-07	3.1E-03	1.2E-08	1.0E-03	7.0E-05	NA	1.5E-01	1.4E-02	NC	3.1E+00	1.2E-05	3.3E+00
Chromium (VI)	2.8E+01	3.6E-04	2.4E-06	8.3E-07	1.2E-04	1.3E-07	5.0E-03	5.5E-04	NA	7.2E-02	4.4E-03	NC	2.5E-02	2.6E-05	1.0E-01
Chromium (III)	1.1E+02	1.4E-03	9.2E-06	3.2E-06	4.8E-04	5.1E-07	1.0E+00	4.0E-02	NA	1.4E-03	2.3E-04	NC	4.8E-04	5.1E-07	2.1E-03
Lead	1.2E+04	1.5E-01	1.0E-03	3.5E-04	2.4E-01	2.2E-06	NA	NA	NA	NC	NC	NC	NC	NC	NC
Manganese	3.0E+02	3.8E-03	2.6E-05	8.9E-06	3.4E-02	5.0E-07	1.4E-01	4.2E-03	1.4E-05	2.7E-02	6.1E-03	6.2E-01	2.4E-01	3.5E-06	9.0E-01
Mercury	7.3E-02	9.3E-07	6.2E-09	2.2E-09	3.0E-06	7.7E-11	3.0E-04	4.5E-05	8.6E-05	3.1E-03	1.4E-04	2.5E-05	1.0E-02	2.6E-07	1.3E-02
Thallium	2.5E+01	3.2E-04	2.1E-06	7.4E-07	4.1E-05	2.4E-06	8.0E-05	8.0E-05	NA	4.0E+00	2.7E-02	NC	5.2E-01	3.1E-02	4.6E+00
2,4-Dinitrotoluene	5.6E+00	7.2E-05	1.4E-05	1.7E-07	1.9E-01	7.5E-10	2.0E-03	1.5E-03	NA	3.6E-02	9.6E-03	NC	9.5E+01	3.8E-07	9.5E+01
2,6-Dinitrotoluene	5.9E-01	7.6E-06	1.5E-06	1.7E-08	2.2E-02	7.3E-11	1.0E-03	7.5E-04	NA	7.6E-03	2.0E-03	NC	2.2E+01	7.3E-08	2.2E+01
									Total Hazard Index:	2E+01	9E+00	2E+00	2E+02	3E-02	2E+02

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 42 DEPOT WORKER

INPUT		OUTPUT						
MEDIUM	LEVEL			percentiles				
LEAD IN AIR (ug/m^3)	0.1		50th	90th	95th	98th	99th	
LEAD IN SOIL (ug/g)	11776	BLOOD Pb, ADULT (ug/dl)	10.2	16.0	18.1	20.9	23.1	
LEAD IN WATER (ug/l)	15							
PLANT UPTAKE? 1=YES 0=NO	0							
AIRBORNE DUST (ug/m^3)	50							

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-specific constant		concentration in medium		contact rate			percent of total
SOIL CONTACT:	2.30	= 0	1E-04	g/dl)/(ug/day) *	11776	ug/g *	1.85	g soil/day	(5 g/m^2 * 0.37 m^2)	23%
SOIL INGESTION:	5.18	=	0.018	g/dl)/(ug/day) *	11776	ug/g *	0.025	g soil/day		51%
INHALATION:	0.98	=	1.64	g/dl)/(ug/m^3) *	0.60	ug/m^3				10%
WATER INGESTION:	0.84	=	0.04	g/dl)/(ug/day) *	15	ug/l *	1.4	l water/day		8%
FOOD INGESTION:	0.88	=	0.04	g/dl)/(ug/day) *	10.0	ug Pb/kg diet *	2.2	kg diet/day		9%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD = 0 .945 * 10 + 0.055 * Pb in produce (ug/kg) = 10.0 ug/kg

LEAD IN PRODUCE = 10 ug/kg or 0.00045 * soil lead d = 10.0 ug/kg

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 42 CONSTRUCTION WORKER

INPUT		OUTPUT					
MEDIUM	LEVEL		percentiles				
			50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.1	BLOOD Pb, ADULT(µg/dL)	9.1	14.3	16.2	18.7	20.6
LEAD IN SOIL (ug/g)	6251						
LEAD IN WATER (ug/l)	15						
PLANT UPTAKE? 1=YES 0=NO	0						
AIRBORNE DUST (ug/m^3)	50						

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant			Concentration in Medium		Contact Rate			percent of total
SOIL CONTACT:	1.22	=	1E-04	(ug/dl)/(ug/day)	*	6251	ug/g *	1.85	g soil/day (5 g/m^2 * 0.37 m^2)		13%
SOIL INGESTION:	5.50	=	0.018	(ug/dl)/(ug/day)	*	6251	ug/g *	0.05	g soil/day		60%
INHALATION:	0.68	=	1.64	(ug/dl)/(ug/m^3)	*	0.41	ug/m^3				7%
WATER INGESTION:	0.84	=	0.04	(ug/dl)/(ug/day)	*	15	ug/l *	1.4	l water/day		9%
FOOD INGESTION:	0.88	=	0.04	(ug/dl)/(ug/day)	*	10.0	ug Pb/kg diet *	2.2	kg diet/day		10%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD	=	.945 * 10 + 0.055 * Pb in produce (ug/kg) =		10.0	ug/kg	
LEAD IN PRODUCE	=	10 ug/kg or 0.00045 * soil lead	d	=	10.0	ug/kg

OUTPUT FROM EPA IEUBK LEAD 0.5 MODEL FOR CHILDREN (SWMU 42)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	7609.2	200.0
1-2	7609.2	200.0
2-3	7609.2	200.0
3-4	7609.2	200.0
4-5	7609.2	200.0
5-6	7609.2	200.0
6-7	7609.2	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

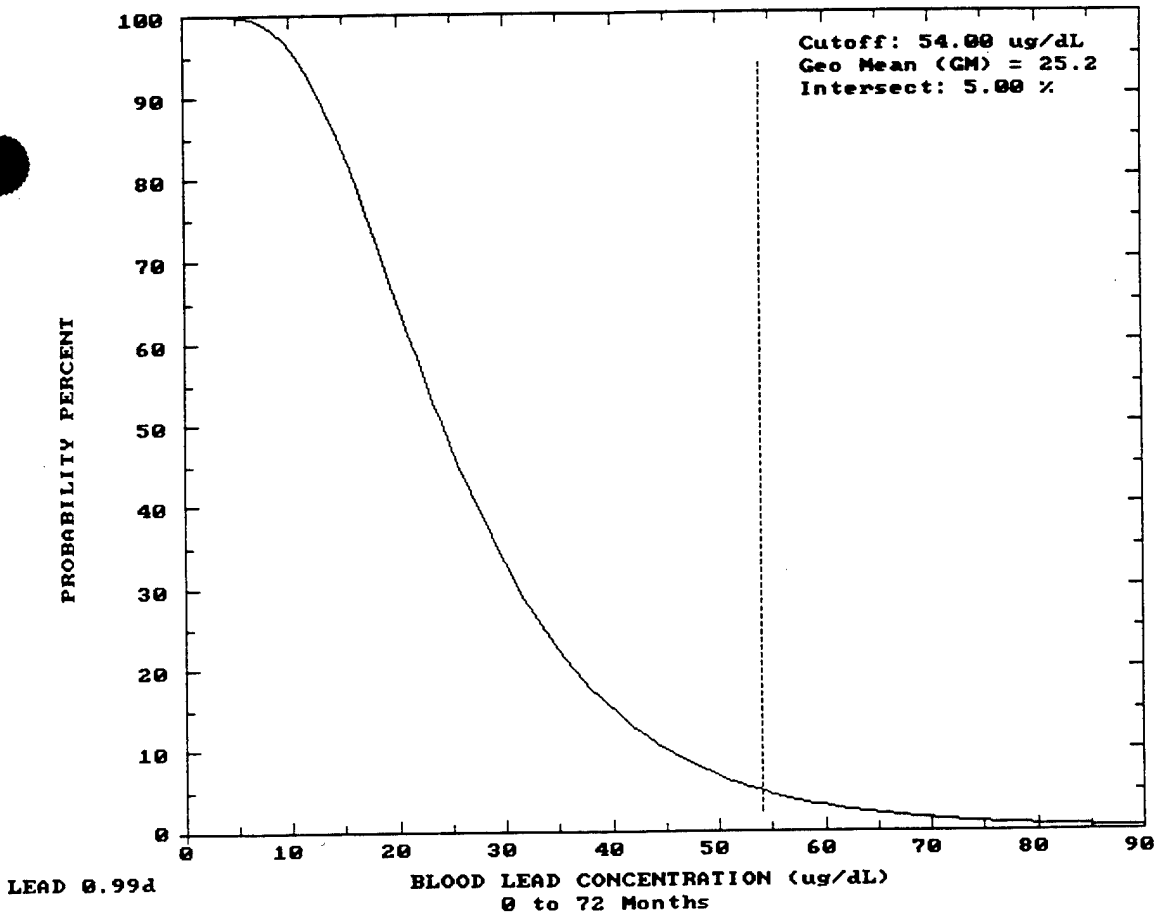
MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	25.4	51.10	49.35
1-2:	29.1	74.95	72.94
2-3:	27.9	79.70	77.33
3-4:	27.5	84.24	81.78
4-5:	24.1	72.57	69.80
5-6:	21.2	69.94	66.82
6-7:	19.1	68.86	65.37

AR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	1.51	0.22	0.00	0.02
1-2:	1.47	0.51	0.00	0.03
2-3:	1.75	0.56	0.00	0.06

3-4:	1.78	0.61	0.00	0.07
4-5:	1.98	0.72	0.00	0.07
5-6:	2.22	0.81	0.00	0.09
6-7:	2.54	0.86	0.00	0.09


Cutoff: 54.00 ug/dL
Geo Mean (GM) = 25.2
Intersect: 5.00 %
PROBABILITY PERCENT
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
LEAD 0.99d
BLOOD LEAD CONCENTRATION (ug/dL)
0 to 72 Months

SWMU 45

TOXICITY INDICIES FOR SELECTION OF COPCs
IN SEDIMENT
SWMU 45 - STORMWATER DISCHARGE AREA

Compound	Maximum Concentration mg/kg	Percent of Detects	Chronic Oral RfD	Non-carcinogenic Index	Percent of Total	Oral Slope Factor	Carcinogenic Index	Percent of Total	Comments
Arsenic	9.50E+01	100	3.00E-04	**3.17E+05**	51.3	1.80E+00	**1.71E+02**	99.6	
Thallium	2.21E+01	80	8.00E-05	**2.76E+05**	44.7				
Chromium	4.50E+01	100	5.00E-03	**9.00E+03**	1.5				
Cadmium	6.35E+00	100	1.00E-03	**6.35E+03**	1.0				
Vanadium	3.34E+01	100	7.00E-03	**4.77E+03**	0.8				
Zinc	4.80E+02	100	3.00E-01	1.60E+03	0.3				
Nickel	2.290E+01	100	2.00E-02	1.15E+03	0.2				
Dieldrin	2.80E-02	80	5.00E-05	5.60E+02	0.09	1.60E+01	4.48E-01	0.3	
Mercury	1.23E-01	40	3.00E-04	**4.10E+02**	0.07				More toxic by inhalation
Silver	1.95E+00	80	5.00E-03	3.90E+02	0.06				
p,p-DDT	1.40E-01	60	5.00E-04	2.80E+02	0.05	3.40E-01	4.76E-02	0.03	
Selenium	1.23E+00	60	5.00E-03	2.46E+02	0.04				
Cyanide	2.12E+00	20	2.00E-02	1.06E+02	0.02				
Toluene	6.00E-02	40	2.00E-01	3.00E-01	0.00005				
p,p-DDD	7.00E-01	80				2.40E-01	1.68E-01	0.1	
p,p-DDE	5.20E-02	60				3.40E-01	1.77E-02	0.01	
Cobalt	7.99E+00	80							
Lead	5.94E+02	100							

Total noncarcinogenic index:	6.18E+05	Total carcinogenic index:	1.72E+02
Total noncarcinogenic index for COPCs:	6.13E+05	Total carcinogenic index for COPCs:	1.71E+02

Contaminants of potential concern (COPCs) are in bold and underlined.

TEAD-N, SWMU 45 - STORMWATER DISCHARGE AREA

RME RISK CALCULATIONS FOR DEPOT PERSONNEL

Chemical	Exposure Point Concentration Sediment (mg/kg)	Exposure Point Concentration Surface Water (µg/l)	Exposure Point Concentration Soil (mg/kg)	Lifetime Average Oral Dose Sediment (mg/kg-day)	Lifetime Average Dermal Dose Sediment (mg/kg-day)	Lifetime Average Oral Dose Surface Water (mg/kg-day)	Lifetime Average Dermal Dose Surface Water (mg/kg-day)	Lifetime Average Inhalation Dose Soil (mg/kg-day)	Oral Slope Factor Water (mg/kg-day)-1	Oral Slope Factor Soil (mg/kg-day)-1	Dermal Slope Factor (mg/kg-day)-1	Inhalation Slope Factor (mg/kg-day)-1	Oral Cancer Risk Sediment	Dermal Cancer Risk Sediment	Oral Cancer Risk Surface Water	Dermal Cancer Risk Surface Water	Inhalation Cancer Risk Soil	Total Cancer Risk
Arsenic	6.4E+01	7.7E+00	NA	2.7E-07	3.5E-08	3.2E-08	2.8E-09	NC	1.8E+00	1.8E+00	1.8E+00	1.5E+01	4.8E-07	6.2E-08	5.8E-08	5.0E-09	NC	6.1E-07
Cadmium	6.0E+00	ND	3.0E+00	2.5E-08	3.2E-09	NC	NC	3.1E-11	NA	NA	NA	6.3E+00	NC	NC	NC	NC	2.0E-10	2.0E-10
Bis(2-ethylhexyl)phthalate	ND	2.0E+01	NA	NC	NC	8.4E-08	2.4E-07	NC	1.4E-02	1.4E-02	5.6E-02	NA	NC	NC	1.2E-09	1.3E-08	NC	1.5E-08
4-Methylphenol	ND	1.5E+00	ND	NC	NC	6.3E-09	5.4E-09	NC	NA	NA	NA	NA	NC	NC	NC	NC	NC	NC
												Total Cancer Risk:	5E-07	6E-08	6E-08	2E-08	2E-10	6E-07

Chemical	Exposure Point Concentration Sediment (mg/kg)	Exposure Point Concentration Surface Water (µg/l)	Exposure Point Concentration Soil (mg/kg)	Oral Dose Sediment (mg/kg-day)	Dermal Dose Sediment (mg/kg-day)	Oral Dose Surface Water (mg/kg-day)	Dermal Dose Surface Water (mg/kg-day)	Inhalation Dose Soil (mg/kg-day)	Oral RfD Water (mg/kg-day)	Oral RfD Soil (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient Sediment	Dermal Hazard Quotient Sediment	Oral Hazard Quotient Surfac Water	Dermal Hazard Quotient Surface Water	Inhalation Hazard Quotient Soil	Chemical Hazard Index
Arsenic	6.4E+01	7.7E+00	NA	7.5E-07	9.7E-08	9.0E-08	7.8E-09	NC	3.0E-04	3.0E-04	3.0E-04	NA	2.5E-03	3.2E-04	3.0E-04	2.6E-05	NC	3.2E-03
Barium	NA	1.0E+02	NA	NC	NC	1.2E-06	1.0E-07	NC	7.0E-02	7.0E-02	3.5E-03	1.0E-04	NC	NC	1.7E-05	2.9E-05	NC	4.6E-05
Cadmium	6.0E+00	ND	3.0E+00	7.0E-08	9.1E-09	NC	NC	7.3E-10	5.0E-04	1.0E-03	7.0E-05	NA	7.0E-05	1.3E-04	NC	NC	NC	2.0E-04
Chromium(III)	4.5E+01	ND	3.3E+01	5.3E-07	6.8E-08	NC	NC	8.1E-09	1.0E+00	1.0E+00	4.0E-02	NA	5.3E-07	1.7E-06	NC	NC	NC	2.2E-06
Cyanide	NA	1.2E+01	NA	NC	NC	1.4E-07	1.2E-08	NC	2.0E-02	2.0E-02	3.4E-03	NA	NC	NC	7.0E-06	3.6E-06	NC	1.1E-05
Lead	4.7E+02	1.6E+00	2.6E+02	5.5E-06	7.1E-07	1.9E-08	1.6E-09	6.4E-08	NA	NA	NA	NA	NC	NC	NC	NC	NC	NC
Manganese	NA	5.6E+01	NA	NC	NC	6.6E-07	5.7E-08	NC	5.0E-03	1.4E-01	4.2E-03	1.4E-05	NC	NC	1.3E-04	3.8E-04	NC	5.1E-04
Mercury	1.0E-01	ND	7.5E-02	1.2E-09	1.5E-10	NC	NC	1.8E-11	3.0E-04	3.0E-04	4.5E-05	8.6E-05	4.0E-06	3.4E-06	NC	NC	2.1E-07	7.6E-06
Silver	NA	NA	7.1E-02	NC	NC	NC	NC	1.7E-11	5.0E-03	5.0E-03	5.0E-04	NA	NC	NC	NC	NC	NC	NC
Thallium	2.0E+01	ND	NA	2.3E-07	3.0E-08	NC	NC	NC	8.0E-05	8.0E-05	8.0E-05	NA	2.9E-03	3.8E-04	NC	NC	NC	3.3E-03
Vanadium	2.8E+01	ND	NA	3.3E-07	4.2E-08	NC	NC	NC	7.0E-03	7.0E-03	7.0E-05	NA	4.7E-05	6.1E-04	NC	NC	NC	6.5E-04
Bis(2-ethylhexyl)phthalate	ND	2.0E+01	NA	NC	NC	2.3E-07	6.7E-07	NC	2.0E-02	2.0E-02	5.0E-03	NA	NC	NC	1.2E-05	1.3E-04	NC	1.5E-04
4-Methylphenol	ND	1.5E+00	ND	NC	NC	1.8E-08	1.5E-08	NC	5.0E-03	5.0E-03	4.0E-03	NA	NC	NC	3.5E-06	3.8E-06	NC	7.3E-06
Toluene	NA	6.8E-01	ND	NC	NC	8.0E-09	3.1E-08	NC	2.0E-01	2.0E-01	2.0E-01	1.1E-01	NC	NC	4.0E-08	1.6E-07	NC	2.0E-07
												Total Hazard Index:	6E-03	1E-03			2E-07	8E-03

NA Not applicable
NC Not calculated
ND Not detected
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 45 - STORMWATER DISCHARGE AREA

RME RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Dermal Slope Factor mg/kg-day)-	Inhalation Slope Factor (mg/kg-day)-1	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Chemical Cancer Risk
Arsenic	3.7E+01	1.2E-06	1.1E-08	5.2E-08	1.8E+00	1.8E+00	1.5E+01	2.2E-06	2.0E-08	7.9E-07	3.1E-06
Cadmium	4.2E+00	1.4E-07	1.3E-09	5.8E-09	NA	NA	6.3E+00	NC	NC	3.7E-08	3.7E-08
							Total Cancer Risk:	2E-06	2E-08	8E-07	3E-06

Chemical	Exposure Point Concentration (mg/kg)	Subchronic Oral Dose (mg/kg-day)	Subchronic Dermal Dose (mg/kg-day)	Subchronic Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Arsenic	3.7E+01	8.7E-05	7.8E-07	3.6E-06	3.0E-04	3.0E-04	NA	2.9E-01	2.6E-03	NC	2.9E-01
Cadmium	4.2E+00	9.8E-06	8.8E-08	4.1E-07	1.0E-03	7.0E-05	NA	9.8E-03	1.3E-03	NC	1.1E-02
Chromium (III)	3.4E+01	7.9E-05	7.1E-07	3.3E-06	1.0E+01	4.0E-01	NA	7.9E-06	1.8E-06	NC	9.7E-06
Lead	3.2E+02	7.4E-04	6.6E-06	3.1E-05	NA	NA	NA	NC	NC	NC	NC
Mercury	7.2E-02	1.7E-07	1.5E-09	7.1E-09	3.0E-04	4.5E-05	8.6E-05	5.7E-04	3.4E-05	8.2E-05	6.8E-04
Silver	1.3E+00	3.0E-06	2.7E-08	1.2E-07	5.0E-03	5.0E-04	NA	6.0E-04	5.3E-05	NC	6.5E-04
Thallium	1.4E+01	3.3E-05	2.9E-07	1.4E-06	8.0E-04	8.0E-04	NA	4.1E-02	3.7E-04	NC	4.1E-02
Vanadium	2.3E+01	5.3E-05	4.7E-07	2.2E-06	7.0E-03	7.0E-05	NA	7.5E-03	6.8E-03	NC	1.4E-02
							Total Hazard Index:	4E-01	1E-02	8E-05	4E-01

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 45 - STORMWATER DISCHARGE AREA

CTE RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Dermal Slope Factor mg/kg-day)-	Inhalation Slope Factor (mg/kg-day)-1	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Chemical Cancer Risk
Arsenic	3.7E+01	3.5E-07	2.0E-09	2.1E-08	1.8E+00	1.8E+00	1.5E+01	6.3E-07	3.6E-09	3.1E-07	9.5E-07
Cadmium	4.2E+00	3.9E-08	2.2E-10	2.3E-09	NA	NA	6.3E+00	NC	NC	1.5E-08	1.5E-08
							Total Cancer Risk:	6E-07	4E-09	3E-07	9.6E-07

Chemical	Exposure Point Concentration (mg/kg)	Subchronic Oral Dose (mg/kg-day)	Subchronic Dermal Dose (mg/kg-day)	Subchronic Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Arsenic	3.7E+01	2.5E-05	1.4E-07	1.5E-06	3.0E-04	3.0E-04	NA	8.2E-02	4.6E-04	NC	8.2E-02
Cadmium	4.2E+00	2.7E-06	1.5E-08	1.6E-07	1.0E-03	7.0E-05	NA	2.7E-03	2.2E-04	NC	3.0E-03
Chromium (III)	3.4E+01	2.2E-05	1.3E-07	1.3E-06	1.0E+01	4.0E-01	NA	2.2E-06	3.1E-07	NC	2.5E-06
Lead	3.2E+02	2.1E-04	1.2E-06	1.2E-05	NA	NA	NA	NC	NC	NC	NC
Mercury	7.2E-02	4.8E-08	2.7E-10	2.8E-09	3.0E-04	4.5E-05	8.6E-05	1.6E-04	6.0E-06	3.3E-05	2.0E-04
Silver	1.3E+00	8.4E-07	4.7E-09	5.0E-08	5.0E-03	5.0E-04	NA	1.7E-04	9.4E-06	NC	1.8E-04
Thallium	1.4E+01	9.2E-06	5.2E-08	5.4E-07	8.0E-04	8.0E-04	NA	1.1E-02	6.5E-05	NC	1.2E-02
Vanadium	2.3E+01	1.5E-05	8.4E-08	8.8E-07	7.0E-03	7.0E-05	NA	2.1E-03	1.2E-03	NC	3.3E-03
							Total Hazard Index:	1E-01	2E-03	3E-05	1E-01

NA Not applicable
NC Not calculated
CTE Central tendency exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 45 - STORMWATER DISCHARGE AREA

RME RISK CALCULATIONS FOR FUTURE TEAD-N RESIDENT

Chemical	Exposure Point Concentration Groundwater (µg/l)	Exposure Point Concentration Soil (mg/kg)	Exposure Point Concentration Surface Water (µg/l)	Groundwater Lifetime Average Oral Dose (mg/kg-day)	Soil			Produce Lifetime Average Oral Dose (mg/kg-day)	Beef Lifetime Average Oral Dose (mg/kg-day)	Groundwater Oral Slope Factor	Soil Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Groundwater Ingestion Cancer Risk	Soil			Produce Ingestion Cancer Risk	Beef Ingestion Cancer Risk	Total Cancer Risk
					Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)								Ingestion Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk			
Arsenic	NA	4.7E+01	7.7E+00	NC	7.3E-05	1.0E-06	2.3E-07	1.5E-04	2.4E-07	1.8E+00	1.8E+00	1.8E+00	1.5E+01	NC	1.3E-04	1.8E-06	3.5E-06	2.7E-04	4.2E-07	4.1E-04
Cadmium	ND	5.0E+00	ND	NC	7.8E-06	1.1E-07	2.5E-08	2.5E-04	2.2E-11	NA	NA	NA	6.3E+00	NC	NC	NC	1.6E-07	NC	NC	1.6E-07
Bis(2-ethylhexyl)phthalate	ND	ND	2.0E+01	NC	NC	NC	NC	NC	3.7E-07	1.4E-02	1.4E-02	NA	NA	NC	NC	NC	NC	NC	5.2E-09	5.2E-09
4-Methylphenol	ND	ND	1.5E+00	NC	NC	NC	NC	NC	7.7E-11	NA	NA	NA	NA	NC	NC	NC	NC	NC	NC	NC
													Total Cancer Risk:	NC	1E-04	2E-06	4E-06	3E-04	4E-07	4E-04

Chemical	Exposure Point Concentration Groundwater (µg/l)	Exposure Point Concentration Soil (mg/kg)	Exposure Point Concentration Surface Water (µg/l)	Groundwater Chronic Oral Dose (mg/kg-day)	Soil			Produce Chronic Oral Dose (mg/kg-day)	Beef Chronic Oral Dose (mg/kg-day)	Groundwater Oral RfD	Soil Oral RfD	Dermal RfD	Inhalation RfD	Groundwater Ingestion Hazard Quotient	Soil			Produce Ingestion Hazard Quotient	Beef Ingestion Hazard Quotient	Total Hazard Quotient
					Chronic Oral Dose (mg/kg-day)	Chronic Dermal Dose (mg/kg-day)	Chronic Inhalation Dose (mg/kg-day)								Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient			
Arsenic	NA	4.7E+01	7.7E+00	NC	6.0E-04	4.0E-06	1.4E-06	8.1E-04	1.5E-06	3.0E-04	3.0E-04	3.0E-04	NA	NC	2.0E+00	1.3E-02	NC	2.7E+00	4.9E-03	4.7E+00
Barium	7.8E+01	NA	1.0E+02	4.0E-03	NC	NC	NC	NC	2.2E-06	7.0E-02	7.0E-02	3.5E-03	1.0E-04	5.7E-02	NC	NC	NC	NC	3.2E-05	5.7E-02
Cadmium	ND	5.0E+00	ND	NC	6.4E-05	4.3E-07	1.5E-07	1.3E-03	1.4E-10	5.0E-04	1.0E-03	7.0E-05	NA	NC	6.4E-02	6.1E-03	NC	1.3E+00	1.4E-07	1.4E+00
Chromium (III)	5.3E+00	3.9E+01	ND	2.7E-04	5.0E-04	3.3E-06	1.1E-06	1.7E-04	4.7E-09	1.0E+00	1.0E+00	4.0E-02	NA	2.7E-04	5.0E-04	8.3E-05	NC	1.7E-04	4.7E-09	1.0E-03
Cyanide	ND	ND	1.2E+01	NC	NC	NC	NC	NC	NC	2.0E-02	2.0E-02	3.4E-03	NA	NC	NC	NC	NC	NC	NC	NC
Lead	ND	3.8E+02	1.6E+00	NC	4.9E-03	3.3E-05	1.1E-05	7.8E-03	1.8E-08	NA	NA	NA	NA	NC	NC	NC	NC	NC	NC	NC
Manganese	2.1E+01	NA	5.6E+01	1.1E-03	NC	NC	NC	NC	3.3E-06	5.0E-03	1.4E-01	4.2E-03	1.4E-05	2.2E-01	NC	NC	NC	NC	2.4E-05	2.2E-01
Mercury	ND	8.5E-02	ND	NC	1.1E-06	7.3E-09	2.5E-09	3.5E-06	2.4E-12	3.0E-04	3.0E-04	4.5E-05	8.6E-05	NC	3.6E-03	1.6E-04	2.9E-05	1.2E-02	7.9E-09	1.6E-02
Selenium	3.7E+00	NA	ND	1.9E-04	NC	NC	NC	NC	NC	5.0E-03	5.0E-03	4.9E-03	NA	3.8E-02	NC	NC	NC	NC	NC	3.8E-02
Silver	ND	1.5E+00	ND	NC	1.9E-05	1.3E-07	4.4E-08	NC	NC	5.0E-03	5.0E-03	5.0E-04	NA	NC	3.8E-03	2.6E-04	NC	NC	NC	4.1E-03
Thallium	NA	1.6E+01	ND	NC	2.1E-04	1.4E-06	4.8E-07	2.7E-05	4.1E-08	8.0E-05	8.0E-05	8.0E-05	NA	NC	2.6E+00	1.7E-02	NC	3.4E-01	5.1E-04	2.9E+00
Vanadium	6.9E+00	2.4E+01	ND	3.5E-04	3.0E-04	2.0E-06	7.0E-07	NC	NC	7.0E-03	7.0E-03	7.0E-05	NA	5.1E-02	4.3E-02	2.9E-02	NC	NC	NC	1.2E-01
Zinc	7.2E+01	NA	ND	3.7E-03	NC	NC	NC	NC	NC	3.0E-01	3.0E-01	9.0E-02	NA	1.2E-02	NC	NC	NC	NC	NC	1.2E-02
Bis(2-ethylhexyl)phthalate	ND	ND	2.0E+01	NC	NC	NC	NC	NC	2.3E-06	2.0E-02	2.0E-02	5.0E-03	NA	NC	NC	NC	NC	NC	1.2E-04	1.2E-04
4-Methylphenol	ND	ND	1.5E+00	NC	NC	NC	NC	NC	4.8E-10	5.0E-03	5.0E-03	4.0E-03	NA	NC	NC	NC	NC	NC	9.7E-08	9.7E-08
Toluene	ND	ND	6.8E-01	NC	NC	NC	NC	NC	1.3E-09	2.0E-01	2.0E-01	2.0E-01	1.1E-01	NC	NC	NC	NC	NC	6.3E-09	6.3E-09
													Total Hazard Index:	4E-01	5E+00	7E-02	3E-05	4E+00	6E-03	9E+00

NA Not applicable
NC Not calculated
ND Not detected
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SWMU 45 CONSTRUCTION WORKER

INPUT		OUTPUT					
MEDIUM	LEVEL		percentiles				
			50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.1						
LEAD IN SOIL (ug/g)	316	BLOOD Pb, ADULT(µg/dL)	2.2	3.5	4.0	4.6	5.1
LEAD IN WATER (ug/l)	15						
PLANT UPTAKE? 1=YES 0=NO	0						
AIRBORNE DUST (ug/m^3)	50						

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-Specific Constant		Concentration in Medium		Contact Rate		percent of total
SOIL CONTACT:	0.06	=	1E-04 (ug/dl)/(ug/day)	*	316 ug/g	*	1.85	g soil/day (5 g/m^2 * 0.37 m^2)	3%
SOIL INGESTION:	0.28	=	0.018 (ug/dl)/(ug/day)	*	316 ug/g	*	0.05	g soil/day	12%
INHALATION:	0.19	=	1.64 (ug/dl)/(ug/m^3)	*	0.12 ug/m^3				8%
WATER INGESTION:	0.84	=	0.04 (ug/dl)/(ug/day)	*	15 ug/l	*	1.4	l water/day	37%
FOOD INGESTION:	0.88	=	0.04 (ug/dl)/(ug/day)	*	10.0 ug Pb/kg diet	*	2.2	kg diet/day	39%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD	=	.945 * 10 + 0.055 * Pb in produce (ug/kg) =		10.0	ug/kg
LEAD IN PRODUCE	=	10 ug/kg or 0.00045 * soil lead	d =	10.0	ug/kg

OUTPUT FROM EPA IEUBK LEAD 0.5 MODEL FOR CHILDREN (SWMU 45)

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	380.0	200.0
1-2	380.0	200.0
2-3	380.0	200.0
3-4	380.0	200.0
4-5	380.0	200.0
5-6	380.0	200.0
6-7	380.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

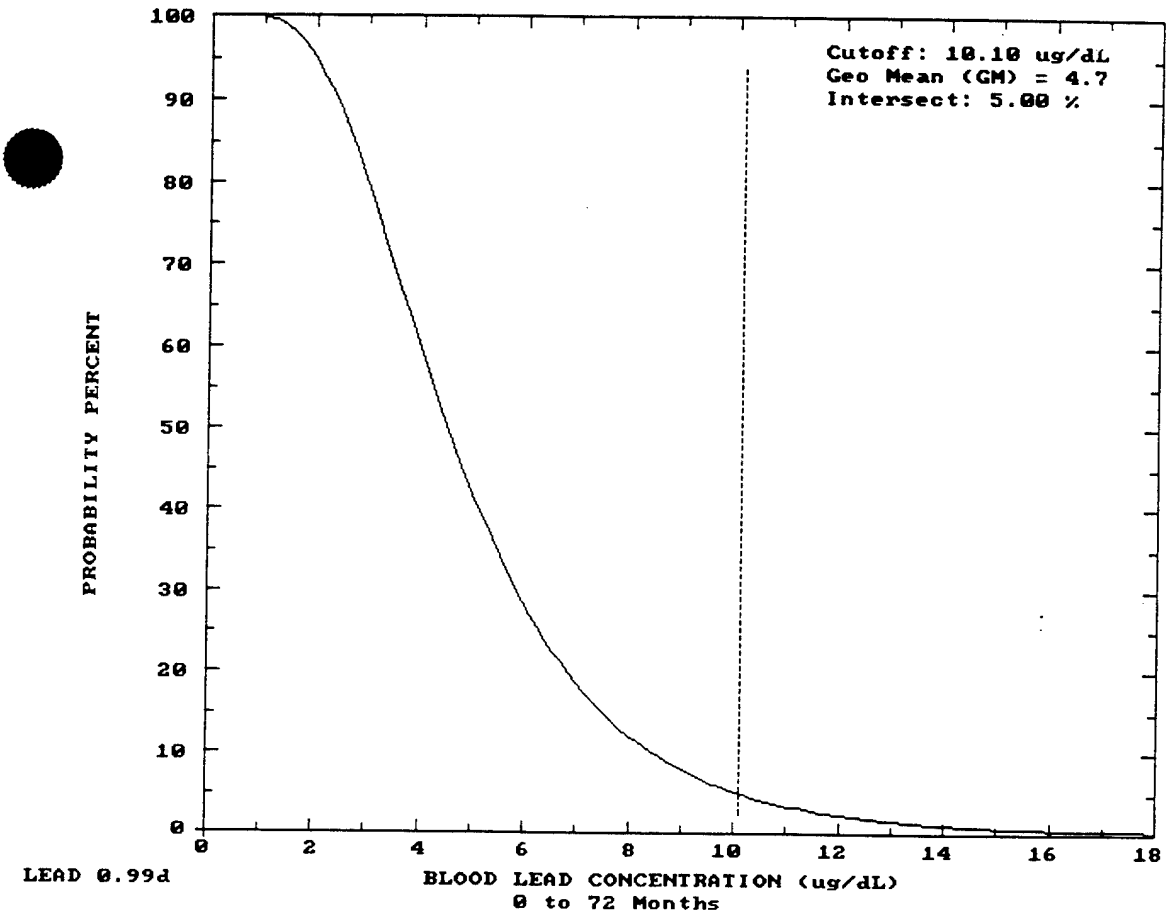
MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	5.0	9.31	6.44
1-2:	5.6	13.58	10.09
2-3:	5.2	14.15	10.24
3-4:	5.0	14.27	10.39
4-5:	4.2	11.82	7.90
5-6:	3.6	11.37	7.18
6-7:	3.3	11.36	6.81

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.49	0.36	0.00	0.02
1-2:	2.56	0.89	0.00	0.03
2-3:	2.92	0.94	0.00	0.06

3-4:	2.85	0.97	0.00	0.07
4-5:	2.82	1.03	0.00	0.07
5-6:	3.00	1.10	0.00	0.09
6-7:	3.33	1.12	0.00	0.09


Cutoff: 10.10 ug/dL
Geo Mean (GM) = 4.7
Intersect: 5.00 %
PROBABILITY PERCENT
100
90
80
70
60
50
40
30
20
10
0
0
2
4
6
8
10
12
14
16
18
LEAD 0.99d
BLOOD LEAD CONCENTRATION (ug/dL)
0 to 72 Months

SWMU 48

TEAD-N, SWMU 48 - OLD DISPENSARY DISCHARGE BUILDING 400

RME RISK CALCULATIONS FOR DEPOT PERSONNEL

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Total Cancer Risk
Carcinogenic PAHs	0.0053	9.3E-10	1.2E-09	9.3E-12	7.3E+00	1.5E+01	NA	6.8E-09	1.7E-08	NC	2.4E-08
Dieldrin	0.12	2.1E-08	2.7E-08	2.1E-10	1.6E+01	3.2E+01	1.6E+01	3.4E-07	8.7E-07	3.4E-09	1.2E-06
p,p-DDD	0.009	1.6E-09	2.0E-09	1.6E-11	2.4E-01	4.8E-01	NA	3.8E-10	9.7E-10	NC	1.4E-09
p,p-DDE	0.01	1.7E-09	2.3E-09	1.7E-11	3.4E-01	3.8E-01	NA	5.9E-10	8.5E-10	NC	1.4E-09
p,p-DDT	0.035	6.1E-09	7.9E-09	6.1E-11	3.4E-01	6.8E-01	3.4E-01	2.1E-09	5.4E-09	2.1E-11	7.5E-09
Cadmium	0.734	1.3E-07	5.5E-09	1.3E-09	NA	NA	6.3E+00	NC	NC	8.1E-09	8.1E-09
							Total Cancer Risk:	3E-07	9E-07	1E-08	1E-06

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg-day)	Chronic Dermal Dose (mg/kg-day)	Chronic Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Dieldrin	0.12	5.9E-08	7.6E-08	5.9E-10	5.0E-05	2.5E-05	NA	1.2E-03	3.0E-03	NC	4.2E-03
Fluoranthene	0.65	3.2E-07	4.1E-07	3.2E-09	4.0E-02	2.0E-02	NA	8.0E-06	2.1E-05	NC	2.8E-05
p,p-DDD	0.009	4.4E-09	5.7E-09	4.4E-11	NA	NA	NA	NC	NC	NC	NC
p,p-DDE	0.01	4.9E-09	6.3E-09	4.9E-11	NA	NA	NA	NC	NC	NC	NC
p,p-DDT	0.035	1.7E-08	2.2E-08	1.7E-10	5.0E-04	2.5E-04	NA	3.4E-05	8.8E-05	NC	1.2E-04
Pyrene	0.6	2.9E-07	3.8E-07	2.9E-09	3.0E-02	1.5E-02	NA	9.8E-06	2.5E-05	NC	3.5E-05
Cadmium	0.734	3.6E-07	1.5E-08	3.6E-09	1.0E-03	7.0E-05	NA	3.6E-04	2.2E-04	NC	5.8E-04
Copper	63	3.1E-05	1.3E-06	3.1E-07	NA	NA	NA	NC	NC	NC	NC
Mercury	0.8165	4.0E-07	1.7E-08	4.0E-09	3.0E-04	4.5E-05	8.6E-05	1.3E-03	3.8E-04	4.7E-05	1.8E-03
Selenium	1.44	7.0E-07	3.0E-08	7.0E-09	5.0E-03	4.9E-03	NA	1.4E-04	6.2E-06	NC	1.5E-04
Thallium	7.265	3.6E-06	1.5E-07	3.6E-08	8.0E-05	8.0E-05	NA	4.4E-02	1.9E-03	NC	4.6E-02
Zinc	109.5	5.4E-05	2.3E-06	5.4E-07	3.0E-01	9.0E-02	NA	1.8E-04	2.6E-05	NC	2.0E-04
							Total Hazard Index:	5E-02	6E-03	5E-05	5E-02

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 48 - OLD DISPENSARY DISCHARGE BUILDING 400

RME RISK CALCULATIONS FOR CONSTRUCTION WORKER

Chemical	Exposure Point Concentration (mg/kg)	Lifetime Average Oral Dose (mg/kg-day)	Lifetime Average Dermal Dose (mg/kg-day)	Lifetime Average Inhalation Dose (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Dermal Slope Factor mg/kg-day)-	Inhalation Slope Factor (mg/kg-day)-1	Oral Cancer Risk	Dermal Cancer Risk	Inhalation Cancer Risk	Chemical Cancer Risk
Carcinogenic PAHs	0.005	1.7E-10	4.5E-11	7.0E-12	7.3E+00	1.5E+01	NA	1.2E-09	6.6E-10	NC	1.9E-09
Dieldrin	0.101	3.4E-09	9.1E-10	1.4E-10	1.6E+01	3.2E+01	1.6E+01	5.4E-08	2.9E-08	2.3E-09	8.6E-08
DDD	0.008	2.8E-10	7.4E-11	1.1E-11	2.4E-01	4.8E-01	NA	6.6E-11	3.5E-11	NC	1.0E-10
DDE	0.009	3.0E-10	8.1E-11	1.3E-11	3.4E-01	3.8E-01	NA	1.0E-10	3.1E-11	NC	1.3E-10
DDT	0.0299	1.0E-09	2.7E-10	4.2E-11	3.4E-01	6.8E-01	3.4E-01	3.4E-10	1.8E-10	1.4E-11	5.4E-10
Cadmium	0.672	2.3E-08	2.0E-10	9.4E-10	NA	NA	6.3E+00	NC	NC	5.9E-09	5.9E-09
							Total Cancer Risk:	6E-08	3E-08	8E-09	9E-08

Chemical	Exposure Point Concentration (mg/kg)	Chronic Oral Dose (mg/kg-day)	Chronic Dermal Dose (mg/kg-day)	Chronic Inhalation Dose (mg/kg-day)	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Inhalation RfD (mg/kg-day)	Oral Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Chemical Hazard Index
Dieldrin	0.101	2.4E-07	6.4E-08	9.9E-09	5.0E-05	2.5E-05	NA	4.7E-03	2.6E-03	NC	7.3E-03
Fluoranthene	0.55	1.3E-06	3.5E-07	5.4E-08	4.0E-01	2.0E-01	NA	3.2E-06	1.7E-06	NC	5.0E-06
DDD	0.008	1.9E-08	5.2E-09	8.0E-10	NA	NA	NA	NC	NC	NC	NC
DDE	0.009	2.1E-08	5.7E-09	8.8E-10	NA	NA	NA	NC	NC	NC	NC
DDT	0.0299	7.0E-08	1.9E-08	2.9E-09	5.0E-04	2.5E-04	NA	1.4E-04	7.5E-05	NC	2.2E-04
Pyrene	0.506	1.2E-06	3.2E-07	4.9E-08	3.0E-01	1.5E-01	NA	4.0E-06	2.1E-06	NC	6.1E-06
Cadmium	0.672	1.6E-06	1.4E-08	6.6E-08	1.0E-03	7.0E-05	NA	1.6E-03	2.0E-04	NC	1.8E-03
Copper	53.9	1.3E-04	1.1E-06	5.3E-06	NA	NA	NA	NC	NC	NC	NC
Mercury	0.689	1.6E-06	1.4E-08	6.7E-08	3.0E-04	4.5E-05	8.6E-05	5.4E-03	3.2E-04	7.9E-04	6.5E-03
Selenium	1.39	3.3E-06	2.9E-08	1.4E-07	5.0E-03	4.9E-03	NA	6.5E-04	6.0E-06	NC	6.6E-04
Thallium	6.6	1.6E-05	1.4E-07	6.5E-07	8.0E-04	8.0E-04	NA	1.9E-02	1.7E-04	NC	2.0E-02
Zinc	96.2	2.3E-04	2.0E-06	9.4E-06	3.0E-01	9.0E-02	NA	7.5E-04	2.2E-05	NC	7.8E-04
							Total Hazard Index:	3E-02	3E-03	8E-04	4E-02

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

TEAD-N, SWMU 48 - OLD DISPENSARY DISCHARGE BUILDING 400

RME RISK CALCULATIONS FOR FUTURE TEAD-N RESIDENT

Chemical	Exposure Point Concentration (mg/kg)	Soil Lifetime Average Oral Dose (mg/kg-day)	Soil Lifetime Average Dermal Dose (mg/kg-day)	Soil Lifetime Average Inhalation Dose (mg/kg-day)	Produce Lifetime Average Oral Dose (mg/kg-day)	Beef Lifetime Average Oral Dose (mg/kg-day)	Oral Slope Factor	Dermal Slope Factor	Inhalation Slope Factor	Soil Ingestion Cancer Risk	Soil Dermal Cancer Risk	Soil Inhalation Cancer Risk	Produce Ingestion Cancer Risk	Beef Ingestion Cancer Risk	Total Cancer Risk
Carcinogenic PAHs	5.3E-03	8.3E-09	3.4E-09	2.6E-11	1.5E-07	1.8E-13	7.3E+00	1.5E+01	NA	6.1E-08	5.0E-08	NC	1.1E-06	1.3E-12	1.2E-06
Dieldrin	1.2E-01	1.9E-07	7.7E-08	5.9E-10	3.4E-05	1.3E-13	1.6E+01	3.2E+01	1.6E+01	3.0E-06	2.5E-06	9.5E-09	5.4E-04	2.1E-12	5.4E-04
p,p'-DDD	9.0E-03	1.4E-08	5.8E-09	4.5E-11	2.0E-07	4.1E-13	2.4E-01	4.8E-01	NA	3.4E-09	2.8E-09	NC	4.9E-08	9.9E-14	5.5E-08
p,p'-DDE	1.0E-02	1.6E-08	6.4E-09	5.0E-11	7.8E-08	2.8E-12	3.4E-01	3.8E-01	NA	5.3E-09	2.4E-09	NC	2.7E-08	9.4E-13	3.4E-08
p,p'-DDT	3.5E-02	5.5E-08	2.2E-08	1.7E-10	8.1E-07	1.6E-12	3.4E-01	6.8E-01	3.4E-01	1.9E-08	1.5E-08	5.9E-11	2.7E-07	5.3E-13	3.1E-07
Cadmium	7.3E-01	1.1E-06	1.6E-08	3.6E-09	3.6E-05	3.4E-13	NA	NA	6.3E+00	NC	NC	2.3E-08	NC	NC	2.3E-08
									Total Cancer Risk:	3E-06	3E-06	3E-08	5E-04	5E-12	5E-04

Chemical	Exposure Point Concentration (mg/kg)	Soil Chronic Oral Dose (mg/kg-day)	Soil Chronic Dermal Dose (mg/kg-day)	Soil Chronic Inhalation Dose (mg/kg-day)	Produce Chronic Oral Dose (mg/kg-day)	Beef Chronic Oral Dose (mg/kg-day)	Oral RfD	Dermal RfD	Inhalation RfD	Soil Ingestion Hazard Quotient	Soil Dermal Hazard Quotient	Soil Inhalation Hazard Quotient	Produce Ingestion Hazard Quotient	Beef Ingestion Hazard Quotient	Total Hazard Quotient
Dieldrin	1.2E-01	1.5E-06	3.1E-07	3.6E-09	1.8E-04	8.3E-13	5.0E-05	2.5E-05	NA	3.1E-02	1.2E-02	NC	3.6E+00	1.7E-08	3.6E+00
Fluoranthene	6.5E-01	8.3E-06	1.7E-06	1.9E-08	4.4E-04	1.3E-11	4.0E-02	2.0E-02	NA	2.1E-04	8.3E-05	NC	1.1E-02	3.1E-10	1.1E-02
p,p'-DDD	9.0E-03	1.2E-07	2.3E-08	2.7E-10	1.1E-06	2.6E-12	NA	NA	NA	NC	NC	NC	NC	NC	NC
p,p'-DDE	1.0E-02	1.3E-07	2.6E-08	3.0E-10	4.1E-07	1.7E-11	NA	NA	NA	NC	NC	NC	NC	NC	NC
p,p'-DDT	3.5E-02	4.5E-07	9.0E-08	1.0E-09	4.3E-06	9.9E-12	5.0E-04	2.5E-04	NA	8.9E-04	3.6E-04	NC	8.6E-03	2.0E-08	9.8E-03
Pyrene	6.0E-01	7.7E-06	1.5E-06	1.8E-08	4.2E-04	1.1E-11	3.0E-02	1.5E-02	NA	2.6E-04	1.0E-04	NC	1.4E-02	3.7E-10	1.4E-02
Cadmium	7.3E-01	9.4E-06	6.3E-08	2.2E-08	1.9E-04	2.1E-12	1.0E-03	7.0E-05	NA	9.4E-03	9.0E-04	NC	1.9E-01	2.1E-09	2.0E-01
Copper	6.3E+01	8.1E-04	5.4E-06	1.9E-06	1.5E-02	9.0E-09	NA	NA	NA	NC	NC	NC	NC	NC	NC
Mercury	8.2E-01	1.0E-05	7.0E-08	2.4E-08	3.4E-05	2.4E-12	3.0E-04	4.5E-05	8.6E-05	3.5E-02	1.6E-03	2.8E-04	1.1E-01	8.0E-09	1.5E-01
Selenium	1.4E+00	1.8E-05	1.2E-07	4.3E-08	NC	NC	5.0E-03	4.9E-03	NA	3.7E-03	2.5E-05	NC	NC	NC	3.7E-03
Thallium	7.3E+00	9.3E-05	6.2E-07	2.1E-07	1.2E-05	2.0E-09	8.0E-05	8.0E-05	NA	1.2E+00	7.8E-03	NC	1.5E-01	2.5E-05	1.3E+00
Zinc	1.1E+02	1.4E-03	9.4E-06	3.2E-06	NC	7.3E-08	3.0E-01	9.0E-02	NA	4.7E-03	1.0E-04	NC	NC	2.4E-07	4.8E-03
									Total Hazard Index:	1E+00	2E-02	3E-04	4E+00	2E-05	5E+00

NA Not applicable
NC Not calculated
RME Reasonable maximum exposure
TEAD-N Tooele Army Depot North Area

SECTION K-3

SUMMARY OF THE ECOLOGICAL EVALUATIONS AND ECOLOGICAL TOXICITY QUOTIENTS

ECOLOGICAL EVALUATION OF TIER 2 COPECS
SWMU 1—MAIN DEMOLITION AREA

Analyte	RME Concentration in Soil (mg/kg)	Dose (mg/kg/day)				Eco-Protective Concentration in Soil (mg/kg)	NOAEL (mg/kg/day)
		Mouse	Rat	Kangaroo Rat	Rabbit		
Antimony	1.3E+01	2.24	1.2	0.92	0.67	2-10	
Cadmium	1.8E+01					1-5	
Chromium	1.5E+01					300	
Cobalt	4.7E+00					5.0	
Cyanide	1.0E+00	0.17	0.1	0.07	0.05	10.8	
Lead	3.8E+03					100	
Manganese	1.1E+00					400	
Nickel	1.4E+01					1.50	
Silver	6.4E-01					0.7-5	

ECOLOGICAL EVALUATION OF TIER 2 COPECS
SWMU 1b—BURN PAD

Analyte	RME Concentration in Soil (mg/kg)	Dose (mg/kg/day)				Eco-Protective Concentration in Soil (mg/kg)	NOAEL (mg/kg/day)
		Mouse	Rat	Kangaroo Rat	Rabbit		
Barium	1.5E+02	25.8	13.86	10.85	7.7	20	
Cadmium	3.5E-01	0.058	0.03	0.02	0.018	1-5	
Lead	3.7E+01	6.23	3.35	2.62	1.86	100	
Silver	3.0E-01	0.049	0.026	0.02	0.015	0.7-5	
Zinc	6.4E+01	10.7	5.75	4.5	3.2	240	
2.4.6-Irinitrotoluene	1.7E+00	0.29	0.15	0.12	0.08		0.4

ECOLOGICAL EVALUATION OF TIER 2 COPECS
SWMU 1c—TRASH BURN PITS

Analyte	RME Concentration in Soil (mg/kg)	Dose (mg/kg/day)				Eco-Protective Concentration in Soil (mg/kg)	NOAEL (mg/kg/day)
		Mouse	Rat	Kangaroo Rat	Rabbit		
0-0.5 feet							
Antimony	7.0E+00	1.17	0.63	0.49	0.35	2-10	
Barium	1.6E+02	26.8	14.4	11.2	8.0	20	
Cadmium	2.3E+01	3.85	2.07	1.62	1.15	1-5	
Cobalt	4.6E+00	0.77	0.41	0.32	0.23	5	
Copper	4.6E+01	7.7	4.14	3.24	2.3	600	
Lead	1.4E+02	22.6	12.1	9.5	6.75	100	
Manganese	3.7E+02	62.6	33.6	26.3	18.7	400	
Silver	3.1E+01	5.21	2.8	2.2	1.55	2.0	
Thallium	3.3E+00	0.55	0.29	0.23	0.16	1.0	
Vanadium	1.9E+01	3.23	1.74	1.36	0.96	10	
Zinc	1.5E+02	24.8	13.3	10.4	7.4	240	
0-2.0 feet							
Antimony	6.5E+00	1.1				2-10	
Barium	2.0E+02	33.5	18	14.1	10	20	
Cadmium	2.0E+01					1-5	
Cobalt	4.5E+00					5	
Copper	4.6E+01					600	
Lead	1.3E+02					100	
Manganese	3.8E+02					400	
Nickel	1.3E+01	2.16	1.16	0.91	0.645	150	
Silver	2.7E+01					2.0	
Thallium	3.3E+00					1.0	
Vanadium	1.8E+01						
Zinc	2.5E+02					400	

ECOLOGICAL EVALUATION OF TIER 2 COPECS
SWMU 1d—PROPELLANT BURN PANS

Analyte	RME Concentration in Soil (mg/kg)	Dose (mg/kg/day)				Eco-Protective Concentration in Soil (mg/kg)	NOAEL (mg/kg/day)
		Mouse	Rat	Kangaroo Rat	Rabbit		
Barium	3.2E+02	54.1	29.07	22.8	16.15	20	
Cadmium	1.6E+00	0.26	0.14	0.11	0.08	1-5	
Lead	1.3E+03	212.7	190.5	9.5	63.5	100	
Thallium	9.8E+00	1.64	0.88	0.69	0.49	1.0	
2,4-Dinitrotoluene	7.0E-01	0.117	0.06	0.049	0.035		3.9

ECOLOGICAL EVALUATION OF TIER 2 COPECS
SWMU 20—AED DEACTIVATION FURNACE SITE

Analyte	RME Concentration in Soil (mg/kg)	Dose (mg/kg/day)				Eco-Protective Concentration in Soil (mg/kg)	NOAEL (mg/kg/day)
		Mouse	Rat	Kangaroo Rat	Rabbit		
Antimony	2.1E+01	0.007	0.036	0.007	0.15	2-10	
Barium	5.4E+02	90.78	49	38.2	27.1	20	
Cadmium	1.2E+01	1.84	1.0	0.817	0.58	1-5	
Lead	2.0E+03	328				100	
Manganese	2.9E+02	48.4	26	20.3	14.45	400	
Thallium	3.9E-01	0.06	0.03	0.027	0.02	1.0	
Zinc	8.5E+00	1.41	0.76	0.6	0.423	240	

ECOLOGICAL EVALUATION OF TIER 2 COPECS
SWMU 21—DEACTIVATION FURNACE BUILDING

Analyte	RME Concentration in Soil (mg/kg)	Dose (mg/kg/day)				Eco-Protective Concentration in Soil (mg/kg)	NOAEL (mg/kg/day)
		Mouse	Rat	Kangaroo Rat	Rabbit		
Antimony	3.0E+02	50.6				2-10	
Arsenic	1.7E+01					33	
Barium	5.4E+03						
Cadmium	4.1E+02					1-5	
Chromium	1.3E+02					300	
Copper	1.1E+04					600	
Cyanide	2.1E+02	34.6	18.6	14.6	10.35		10.8
Lead	2.5E+04					100	
Manganese	8.7E+02					400	
Nickel	1.0E+02					150	
Thallium	4.6E+01					1.0	
Zinc	1.1E+04					240	
2.4-Dinitrotoluene	8.1E–01	0.13	0.07	0.056	0.04		3.9
1.3.5-Trinitrobenzene	1.3E+01						
2.4.6-Trinitrotoluene	9.2E-01	0.15	0.08	0.06	0.046		0.4

ECOLOGICAL EVALUATION OF TIER 2 COPECS
SWMU 37—CONTAMINATED WASTE PROCESSOR

Analyte	RME Concentration in Soil (mg/kg)	Dose (mg/kg/day)				Eco-Protective Concentration in Soil (mg/kg)	NOAEL (mg/kg/day)
		Mouse	Rat	Kangaroo Rat	Rabbit		
Zinc	1.4E+02	24	12.87	10.08	9.15	240	
2,4,6-Trinitrotoluene	5.0E-01	0.108	0.04	0.036	0.02		0.4

ECOLOGICAL EVALUATION OF TIER 2 COPECS
SWMU 42—BOMB WASHOUT BUILDING

Analyte	RME Concentration in Soil (mg/kg)	Dose (mg/kg/day)				Eco-Protective Concentration in Soil (mg/kg)	NOAEL (mg/kg/day)
		Mouse	Rat	Kangaroo Rat	Rabbit		
Antimony	2.4E+02	40.03	21.5	17.7	11.95	2-10	
Arsenic	2.2E+01	3.6	1.9	1.5	1.09	33	
Barium	3.8E+03					20	
Chromium	8.3E+01					300	
Copper	1.9E+03					600	
Lead	9.2E+03					100	
Manganese	3.0E+02					400	
Mercury	6.5E-02					1000	
Nickel	3.3E+01					150	
Thallium	2.1E+01					1.0	
Vanadium	1.4E+01					10	
Zinc	8.5E+02					240	
2,4-Dinitrotoluene	3.4E+00	0.57	0.31	0.24	0.17		3.9

ECOLOGICAL EVALUATION OF TIER 2 COPECS
SWMU 45–STORMWATER DISCHARGE AREA

Analyte	RME Concentration in Soil (mg/kg)	Dose (mg/kg/day)				Eco-Protective Concentration in Soil (mg/kg)	NOAEL (mg/kg/day)
		Mouse	Rat	Kangaroo Rat	Rabbit		
Lead	8.0E+02	134.3	72.2	56.5	40.1	100	

Analyte	RME Concentration in Sediment (mg/kg)	Dose (mg/kg/day)				Eco-Protective Concentration in Sediment (mg/kg)		NOAEL (mg/kg/day)
		Mouse	Rat	Kangaroo Rat	Rabbit	ER-M (mg/kg)	ER-L (mg/kg)	
Arsenic	6.4E+01					25	2.0	
Cadmium	6.0E+00					9.0	5.0	
Lead	4.7E+02					110.0	35.0	
Thallium	2.0E+01							
Vanadium	2.8E+01							
PDT	9.6E–02					350	3.0	

Analyte	RME Concentration in Surface Water (µg/l)	Dose (mg/kg/day)				Eco-Protective Concentration in Water (µg/l)		NOAEL (mg/kg/day)
		Mouse	Rat	Kangaroo Rat	Rabbit	ER-M (mg/kg)	ER-L (mg/kg)	
Arsenic	8.6E+00	.04	0.009		0.007			0.0008
Barium	1.1E+02	.08	0.12		0.096			0.21
Chromium	1.2E+01	.01	0.01		0.01			10.8
Manganese	5.8E+01	.04	0.06		0.05			0.005
Lead	1.9E+00							10.0
Toluene	8.1E–01	0.0006	0.0008		0.0007			223

SUMMARY OF ECOTOXICITY QUOTIENTS

SWMU	COPEC	ETQ
1	Sb	1
	Cd	4
	Pb	40
	Mn	3
	Th	10
	Zn	30
	1,3-DNB	3
	2,4,6-TNT	370
1b	Ba	8
	2,4,6-TNT	4
1c–0 to .5'	Ba	8
	Cd	5
	Pb	1
	Ag	20
	Th	3
	V	2
1c–0 to 2'	Ba	10
	Cd	4
	Pb	1
	Ag	10
	Th	3
	Zn	1
1d	Ba	20
	Pb	10
	Th	10
20	Sb	2
	Ba	30
	Cd	2
	Pb	20
21	Sb	300
	Ba	300
	Cd	80
	Cu	20
	Cn	20
	Pb	200
	Mn	2
	Th	40
	Zn	50
	2.4.6-TNT	2